

REPAIR MANUAL



SELF-PROPELLED SCISSOR PLATFORM

242 031 8240 - E 04.04 GB

ISO 9001
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HAULOTTE



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GENERAL

You have just taken delivery of your mobile elevating work platform

It will give you complete satisfaction if you follow the operating and maintenance instructions exactly.

The purpose of this instruction manual is to help you in this.

We stress the importance:

- of complying with the safety instructions relating to the machine itself, its use and its environment,
- of using it within the limits of its performances,
- of proper maintenance upon which its service life depends.

During and beyond the warranty period, our After-Sales Department is at your disposal for any service you might need.

Contact in this case our Local Agent or our Factory After-Sales Department, specifying the exact type of machine and its serial number.

When ordering consumables or spares, use this documentation, together with the «Spares» catalogue so as to receive original parts, the only guarantee of interchangeability and perfect operation.

This manual is supplied with the machine and is included on the delivery note.

REMINDER: You are reminded that our machines comply with the provisions of the «Machines Directive» 89/392/EEC of June 14th 1989 as amended by the directives 91/368/EEC of June 21st 1991, 93/44/EEC of June 14th 1993, 93/68/EEC of July 22nd 1993 and 89/336/EEC of May 3rd 1989, directive 2000/14/CE and directive EMC/89/336/CE.

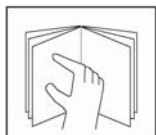


Caution !

The technical data contained in this manual cannot involve our responsibility and we reserve the right to proceed with improvements or modifications without amending this manual.

1 - GENERAL RECOMMENDATIONS - SAFETY

1.1 - GENERAL WARNING



1.1.1 - Manual

This manual aims to help maintenance personnel service and repair the machine. It cannot, however, replace the basic training required by any person working on the site equipment.

The site manager must inform operators of the recommendations in the instruction manual. He is also responsible for application of current "user regulations" in the country of use.

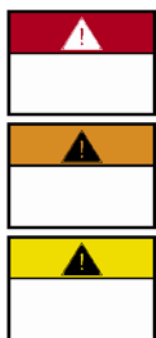
Before operating on the machine, it is essential to be familiar with all the recommendations in this manual and the user manual to ensure personnel and equipment safety.

1.1.2 - Labels

Potential dangers and recommendations for the machine are indicated on labels and plates. Read the instructions on them.

All labels conform to the following colour code:

- Red indicates a potentially fatal danger.
- Orange indicates a danger that may cause serious injury.
- Yellow indicates a danger that may cause material damage or slight injury.



Maintenance personnel must ensure that these labels and plates are in good conditions and keep them legible. Spare labels and plates can be supplied by the manufacturer on request.

1.1.3 - Safety

Ensure that any person entrusted with the machine is take the safety measures implied by its use.

Avoid any working mode that may affect safety. Any use that does not comply with the recommendations may generate risks and damage to people and equipment.

After intervention, maintenance personnel must check that the operator manual is present. This must be kept by the user throughout the machine's service life, even if it is loaned, rented or sold.

Ensure that all the plates or labels related to safety and danger are complete and legible.



Caution!

To attract the reader's attention, instructions are indicated by this standardised sign.

1.2 - GENERAL SAFETY RECOMMENDATIONS

1.2.1 - Operators

Operators must be aged 18 or over and hold an operating permit issued by the employer after verification of medical aptitude and the practical platform operation test.



Caution!

Only trained operators may use Haulotte self-propelled platforms.

There must be at least two operators present, so that one of them can:

- intervene rapidly if necessary,
- take over the controls in the case of accident or breakdown,
- monitor and prevent machines or people from circulating around the platform,
- guide the platform operator if necessary.

1.2.2 - Environment

Never use the machine:

- On soft, unstable or cluttered floors.
- On a floor with a tilt greater than the allowed limit.
- With a windspeed above the permitted level. In case of outdoor use, check that windspeed is lower or equal to the permitted level using an anemometer.
- Near electric lines (find out about minimum distances according to current). In temperatures of less than -15°C (in particular, in cold rooms); consult our service department if work is required in conditions below -15°C.
- In an explosive atmosphere.
- In an incorrectly ventilated area, as exhaust fumes are toxic.
- During storms (risk of being struck by lightning).
- At night if the machine is not equipped with an optional light.
- In the presence of intense electromagnetic fields (radar, mobile and high current).

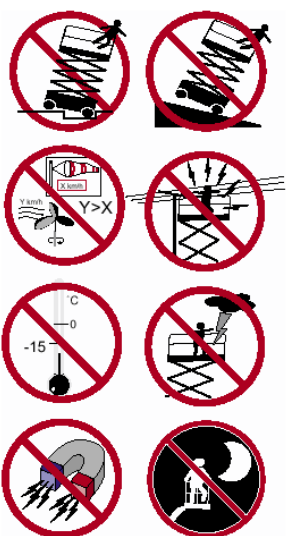
DO NOT DRIVE ON THE PUBLIC HIGHWAY.

1.2.3 - Using the machine

It is important to ensure that in normal use, i.e. platform operation, the platform station selection key remains in the the platform position to enable control of the machine from the platform. If a problem occurs on the platform, a person present and trained in emergency/standby manoeuvres can help by putting the key in the ground control position.

Never use the machine with:

- a load greater than the nominal load,
- more people than the authorised number,
- lateral force in the platform greater than the level permitted,
- wind speed higher than the permitted level.



**Caution!**

**Never use the platform as a crane, goods lift or elevator.
Never use the platform or tow or haul.**

To avoid all risk of serious fall, operators must respect the following instructions:

- Hold the hand rails firmly when climbing onto or operating the platform.
- Wipe any traces of oil or grease off the steps, floor and hand rails.
- Wear protective clothing suited to working conditions and current local legislation, in particular when working in hazardous areas.
- Do not disable the safety system end of stroke contactors.
- Avoid contact with fixed or mobile obstacles.
- Do not increase working height by using ladders or other accessories.
- Never use the hand rails as a means of access for getting onto and off the platform (use the steps provided on the machine).
- Never climb on the hand rails when the platform is raised.
- Never drive the platform at high speed in narrow or cluttered areas.
- Never use the machine without installing the platform protective bar or closing the safety barrier.
- Never climb on the covers.

To avoid risks of tipping over, operators must respect the following instructions:

- Do not disable the safety system end of stroke contactors.
- Avoid moving the steering control levers in the opposite direction, without stopping in the "O" position (to stop during a travel manoeuvre, move the manipulator lever gradually).
- Respect maximum load and maximum number of people authorised on the platform.
- Distribute the load evenly and place in the centre of the platform if possible.
- Check that the floor resists the pressure and load per wheel.
- Avoid contact with fixed or mobile obstacles.
- Do not drive the platform at high speed in narrow or cluttered areas.
- Do not drive the platform in reverse (inadequate visibility).
- Do not use the machine if the platform is cluttered.
- Do not use the machine with equipment or objects hanging from the hand rails.
- Do not use the machine with elements that may increase the wind load (e.g. panels).
- Do not perform machine maintenance operations when the machine is raised without setting up the required safety means (gantry crane, crane).
- Make daily checks and monitor proper operation during periods of use.
- Preserve the machine from any uncontrolled operation when it is not in service.

NB: *Do not tow the platform (it is not designed to be towed and must be transported on a trailer).*

1.3 - RESIDUAL RISKS

1.3.1 - Risks of jolting - tipping over

The risks of jolting or tipping over are high in the following situations:

- sudden action on the control levers,
- platform overload,
- uneven floor (pay attention to thaw periods in winter),
- gusts of wind,
- contact with obstacles on the ground or in the air,
- working on quays, pavements, etc.

Allow sufficient stopping distances:

- 3 metres at high speed,
- 1 metre at low speed.



Caution!

If the machine has a 220 V plug, with max. 16A, the extension must be connected to a mains socket protected by a 30mA differential circuit breaker.

1.3.2 - Electric risks

Electric risks are high in the following situations:

- contact with a live line,
- use during stormy weather.

1.3.3 - Risks of explosion or burning

The risks of explosion or burning are high in the following situations:

- work in an explosive or inflammable atmosphere,
- filling the fuel tank near a naked flame,
- contact with the hot parts of the motor,
- use of a machine with hydraulic leaks.

1.3.4 - Risks of collision

- Risks of crushing people present in the machine's movement area (travel or when manoeuvring the equipment).
- The operator must assess any overhead risks before use.

1.4 - VERIFICATIONS

Comply with current national legislation in the country of use.

In FRANCE: Order dated June 9th 1993 + circular DRT 93-22 dated September 1993, specifying:

1.4.1 - Regular checks

The devices must be regularly inspected every 6 months to detect any defect liable to cause an accident.

These inspections are to be carried out by an organisation or person specially appointed by the site manager and under his responsibility (company personnel or otherwise) Articles R 233-5 and R 233-11 of the Labour Code.

The result of these inspections is recorded in a safety register updated by the site manager and constantly available to the Works Inspector and the company's safety committee, if any, and the list of specially appointed personnel (Article R 233-5 of the Labour Code).

NB: *This register can be obtained from professional organisations and for some, from the OPPBTP or private prevention organisations.*

The appointed people must be experienced in the field of risk prevention (Article R 233-11 of decree no. 93-41).

It is forbidden to allow anyone to perform any checks during machine operation (Article R 233-11 of the Labour Code).

1.4.2 - Examination of device suitability

The manager of the site on which the equipment is used must ensure that the machine is suitable, i.e. appropriate to the work to be carried out safely and that it is used in accordance with the instruction manual. Moreover, the French order, dated June 9th 1993, refers to problems associated with rental, examination of the condition, verifications before starting work after repair, and conditions of static test coefficient 1.25 and dynamic test coefficient 1.1. All responsible users should find out about and respect the requirements of this decree.

1.4.3 - Condition

Detect any deterioration liable to cause dangerous situations (safety devices, load limiters, tilt detector, cylinder leaks, deformation, weld condition, tightness of bolts, hoses and electric connections, tyre condition, excessive mechanical play).

NB: *In the case of rental, responsible users of the rented machine must examine the condition and check suitability. They must check with the rental company that the general regular checks and checks before starting work have been performed.*

1.5 - REPAIRS AND ADJUSTMENTS

Major repairs, interventions or adjustments on the safety systems or elements (concerning mechanical, hydraulic and electric systems) must be carried out by PINGUELY-HAULOTTE personnel or personnel working on behalf of PINGUELY-HAULOTTE, who will only use original spare parts.

Any modification outside PINGUELY-HAULOTTE's control is unauthorised.

The manufacturer is not responsible if original spare parts are not used or if the work specified above is not performed by PINGUELY-HAULOTTE approved personnel.

1.6 - VERIFICATIONS BEFORE RESTARTING WORK

To be performed after:

- major dismantling-reassembly operations,
- repair of the machine's essential devices,
- any accident caused by failure of an essential device.

A suitability examination, examination of the condition, static test and dynamic test must all be carried out (see coefficient paragraph 1.4.2, page 8).

1.7 - BEAUFORT SCALE

The Beaufort Scale of wind force is accepted internationally and is used when communicating weather conditions. It consists of number 0 - 17, each representing a certain strength or velocity of wind at 10m (33 ft) above ground level in the open.

Description of Wind		Specifications for use on land	MPH	m/s
0	Calm	Calm; smoke rises vertically.	0-1	0-0.2
1	Light Air	Direction of wind shown by smoke.	1-5	0.3-1.5
2	Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind.	6-11	1.6-3.3
3	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag.	12-19	3.4-5.4
4	Moderate Breeze	Raises dust and loose paper; small Branches are moved.	20-28	5.5-7.9
5	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets form on inland waterways.	29-38	8.0-10.7
6	Strong Breeze	Large branches in motion; whistling heard in telephone wires; umbrellas used with difficulty.	39-49	10.8-13.8
7	Near Gale	Whole trees in motion; inconvenience felt when walking against wind.	50-61	13.9-17.1
8	Gale	Breaks twigs off trees; generally impedes progress.	62-74	17.2-20.7
9	Strong Gale	Slight structural damage occurs (chimney pots and slates removed).	75-88	20.8-24.4

2 - SPECIFICATION

Self-propelled platforms, models Compact 8, 8W, 10, 10N and 12, are designed for any overhead work within the limits of their characteristics (see paragraph 2.1, page 12) and within the respect of all safety instructions specific to the equipment and places of use.

The main operating station is on the platform.

The other operating station away from the platform is a standby or emergency station.

REMINDEr: For any information, intervention of spare part requests, please specify the machine type and serial number.

2.1 - TECHNICAL CHARACTERISTICS

2.1.1 - Compact 8, Compact 8W technical data

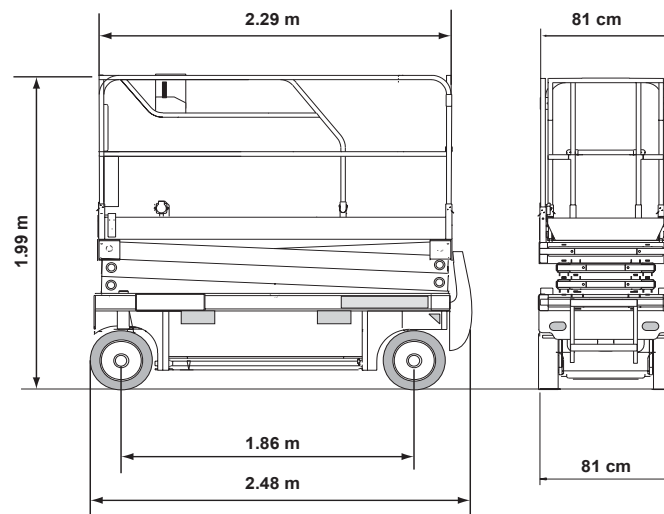
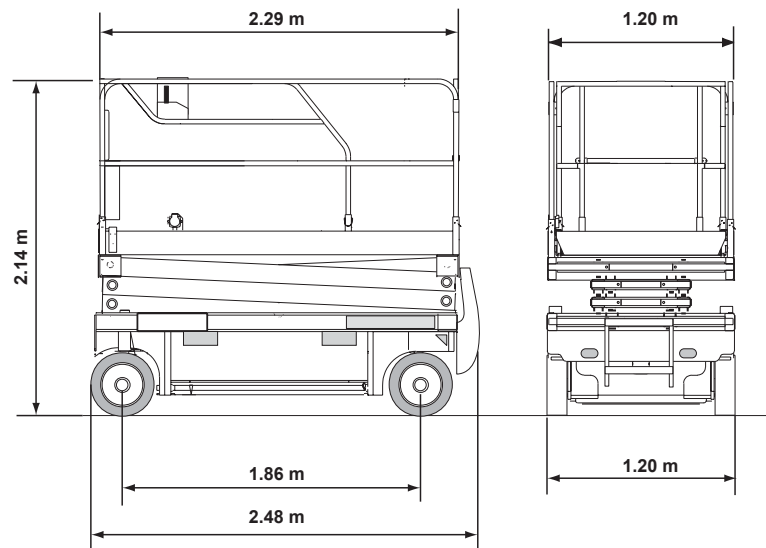
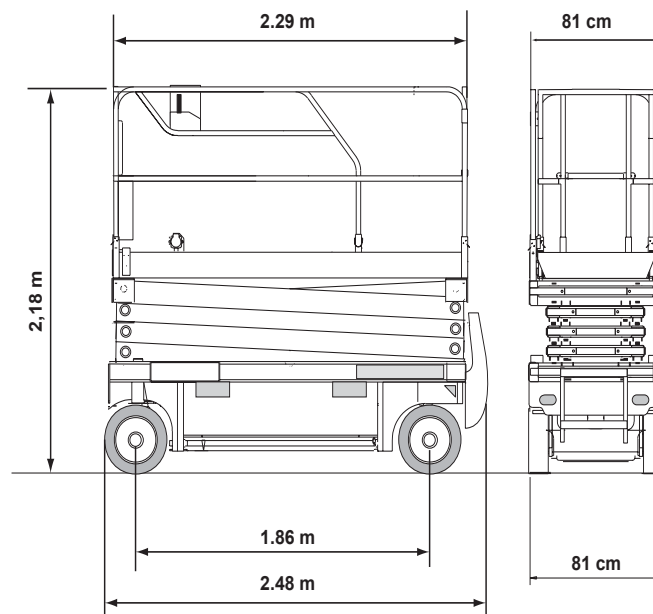
Description	Compact 8	Compact 8W
Load (indoor use)	350 kg, including 2 people	450 kg, including 3 people
Load (outdoor use)	120 kg, including 1 person	120 kg, including 1 person
Manual lateral force (indoor use)	40 daN	40 daN
Manual lateral force (outdoor use)	20 daN	20 daN
Maximum wind speed (indoor use)	0 Km/h	0 Km/h
Maximum wind speed (outdoor use)	45 km/h	45 Km/h
Floor height	6.18 m	6.27 m
Working height	8.18 m	8.27 m
Folded length	2.31 m	
Folded length with steps	2.48 m	
Overall width	0.81 m	1.20 m
Folded height (hand rails)	1.99 m	2.14 m
Folded height (platform)	0.87 m	1.02 m
Wheel base	1.86 m	
Floor clearance	130 mm	
Floor clearance with pothole system extended	25 mm	
Platform dimension	2.3 m x 0.8 m	2.3 m x 1.2 m
Extension dimension	0.92 m	
Extension capacity	150 Kg	
Travel speed, machine folded	0/2.17 mph	
Travel speed, machine raised	0/0.62 mph	
Interior turning radius	0.34 m	0.2 m
Exterior turning radius	2.38 m	2.5 m
Maximum slope during travel	25%	23%
Maximum tilt permitted	2°	3°
Hydraulic tank	25 l	
Total mass	1730 Kg	1950 Kg
Max. load on one wheel	1350 daN	1600 daN
Maximum pressure on the floor	6.7 daN/cm ²	7.9daN/cm ²
Number of drive wheels	2	2
Number of steering wheels	2	2
Tyres	Solid rubber 38x13x5 cm	
Wheel diameter	380 mm	
Freewheel	YES	
Movements	Proportional controls	
Batteries	24 V - 180 Amp/h C5	24 V - 250 Amp/h C5
General hydraulic pressure	200 bars	
Travel	200 bars	
Steering	150 bars	
Lifting	165 bars	
Raising time	37 s	44 s
Lowering time	41 s	56 s
CE standards	YES	

2.1.2 - Compact 10N, Compact 10 technical data

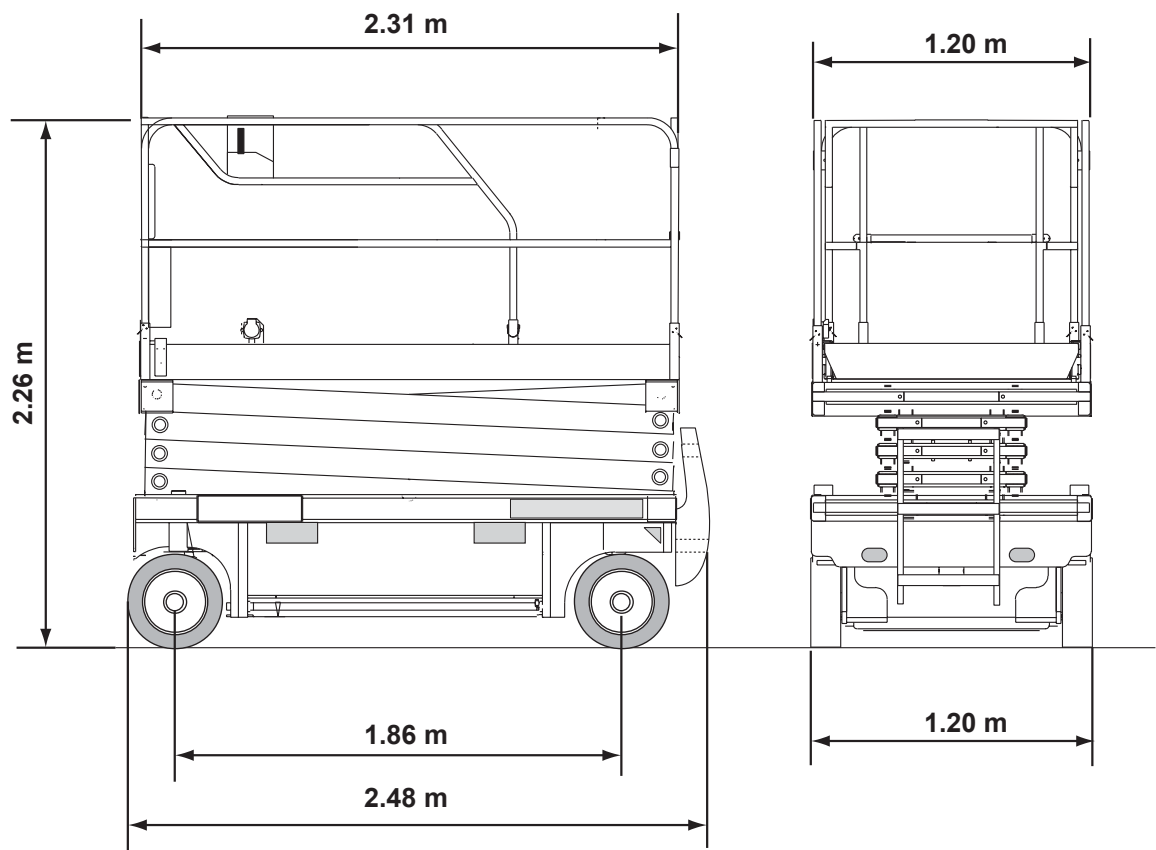
<i>Description</i>	<i>Compact 10N</i>	<i>Compact 10</i>
Load (indoor use)	230 kg including persons	450 kg including 3 persons
Load (outdoor use)	forbidden	120 kg including 1 person
Manual lateral force (indoor use)	40 daN	40 daN
Manual lateral force (outdoor use)	forbidden	20 daN
Maximum wind speed (indoor use)	0 km/h	0 Km/h
Maximum wind speed (outdoor use)	forbidden	45 km/h
Floor height	8.08 m	8.14 m
Working height	10.08 m	10.14 m
Folded length	2.31 m	
Folded length with steps	2.48 m	
Overall width	1.20 m	
Folded height (hand rails)	2.18 m	2.26 m
Folded height (platform)	1.07 m	1.14 m
Wheel base	1.86 m	
Floor clearance	130 mm	
Floor clearance with pothole system extended	25 mm	
Platform dimension	2.3 m x 0.8 m	2.3 m x 1.2 m
Extension dimension	0.92 m	
Extension capacity	120 Kg	150 kg
Travel speed, machine folded	0/2.17 mph (variable)	
Travel speed, machine raised	0.62 mph	
Interior turning radius	0,34 m	0,2m
Exterior turning radius	2,38 m	2.5 m
Maximum slope during travel	23%	
Maximum tilt permitted	2°	3°
Hydraulic tank	25 l	
Total mass	2160 Kg	2330 Kg
Max. load on one wheel	1355 daN	1350 daN
Maximum pressure on the floor	8 daN/cm ²	7.65 daN/cm ²
Number of drive wheels	2	2
Number of steering wheels	2	2
Tyres	Solid rubber 38x13x5 cm	
Wheel diameter	380 mm	
Freewheel	YES	
Movements	Proportional controls	
Batteries	24 V - 180 Amp/h C5	24 V - 250 Amp/h C5
General hydraulic pressure	220 bars	
Travel	220 bars	
Steering	150 bars	
Lifting	165 bars	
Raising time	51 s	
Lowering time	42 s	
CE standards	YES	

2.1.3 - Compact 12 technical data

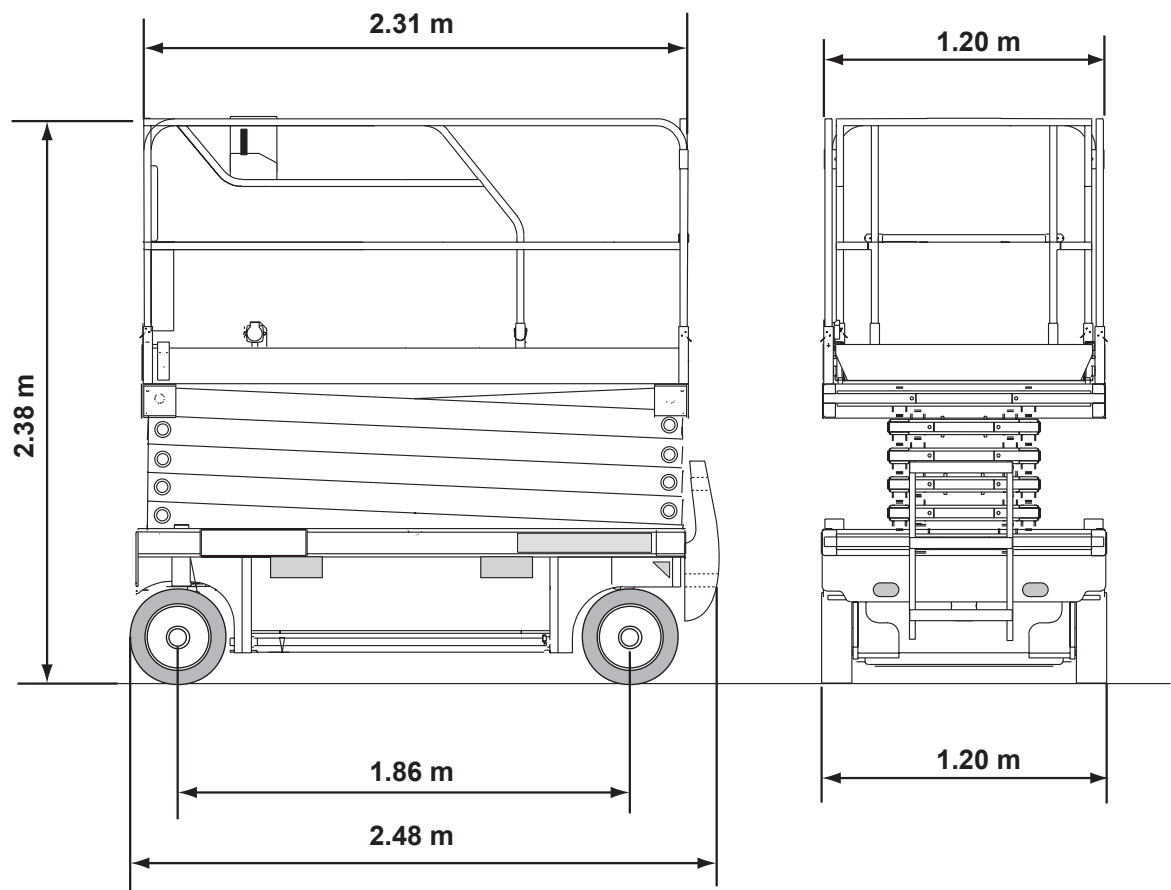
<i>Description</i>	<i>Compact 12</i>
Load (indoor use)	300 kg including 3 persons
Load (outdoor use)	120 kg including 1 person
Manual lateral force (indoor use)	40 daN
Manual lateral force (outdoor use)	20 daN
Maximum wind speed (indoor use)	0 mph
Maximum wind speed (outdoor use)	27.96 mph
Floor height	10 m
Working height	12 m
Folded length	2.31 m
Folded length with steps	2.48 m
Overall width	1.20 m
Folded height (hand rails)	2.38 m
Folded height (platform)	1.26 m
Wheel base	1.86 m
Floor clearance	130 mm
Floor clearance with pothole system extended	25 mm
Platform dimension	2.3 m x 1.2 m
Extension dimension	0.92 m
Extension capacity	150 kg
Travel speed, machine folded	0/2.17 mph (variable)
Travel speed, machine raised	0.62 mph
Interior turning radius	0,2 m
Exterior turning radius	2.5 m
Maximum slope during travel	23%
Maximum tilt permitted	3°
Hydraulic tank	25 l
Total mass	2630 kg
Max. load on one wheel	1600 daN
Maximum pressure on the floor	10.15 daN/cm ²
Number of drive wheels	2
Number of steering wheels	2
Tyres	Solid rubber 38x13x5 cm
Wheel diameter	380 mm
Freewheel	YES
Movements	Proportional controls
Batteries	24 V - 250 Amp/h C5
General hydraulic pressure	240 bars
Travel	240 bars
Steering	150 bars
Lifting	155 bars
Raising time	85 s
Lowering time	50s
CE standards	YES

2.2 - SIZE**2.2.1 - Compact 8 size****2.2.2 - Compact 8W size****2.2.3 - Compact 10N size**

2.2.4 - Compact 10 size



2.2.5 - Compact 12 size



2.3 - TIGHTENING TORQUE**2.3.1 - Tightening torque for large thread screws**

<i>Nominal diameter</i>	<i>Tightening torque in N.M</i>		
	8.8	10.9	12.9
M 6*1	9 to 11	13 to 14	15 to 17
M 7*1	15 to 19	21 to 24	26 to 28
M 8*1.25	22 to 27	31 to 34	37 to 41
M 10*1.5	43 to 45	61 to 67	73 to 81
M 12*1.75	75 to 94	110 to 120	130 to 140
M 14*2	120 to 150	170 to 190	200 to 220
M 16*2	190 to 230	260 to 290	320 to 350
M 18*2.5	260 to 320	360 to 400	440 to 480
M 20*2.5	370 to 450	520 to 570	620 to 680
M 22*2.5	500 to 620	700 to 770	840 to 930
M 24.3*3	630 to 790	890 to 990	1070 to 1180
M 27*3	930 to 1150	1300 to 1400	1560 to 1730
M 30*3.5	1260 to 1570	1770 to 1960	2200 to 2350

2.3.2 - Tightening torque for fine thread screws

<i>Nominal diameter</i>	<i>Tightening torque in N.M</i>		
	8.8	10.9	12.9
M 8*1	24 to 29	33 to 37	40 to 44
M 10*1.25	46 to 57	64 to 71	77 to 85
M 12*1.25	83 to 100	120 to 130	140 to 150
M 14*1.5	130 to 160	180 to 200	220 to 240
M 16*1.5	200 to 250	280 to 310	340 to 370
M 18*1.5	290 to 360	410 to 450	490 to 540
M 20*1.5	410 to 510	570 to 630	690 to 760
M 22*1.5	550 to 680	780 to 870	920 to 1000
M 24*1.5	690 to 860	970 to 1070	1160 to 1290
M 27*2	1000 to 1300	1400 to 1560	1690 to 1880
M 30*2	1400 to 1700	1960 to 2180	2350 to 2610

3 - SAFETY SYSTEMS

3.1 - RELAY AND FUSE FUNCTIONS

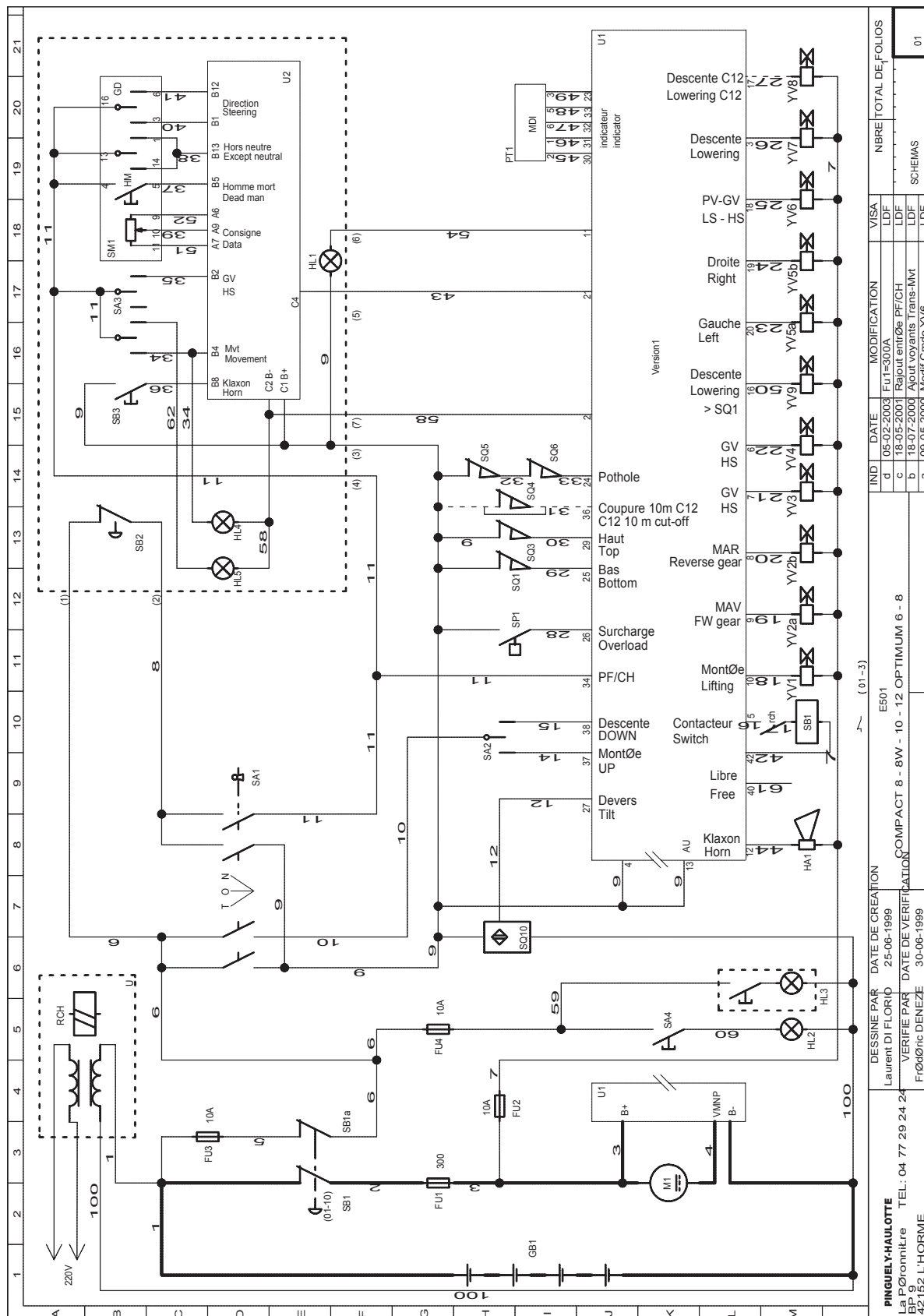
<i>Reference</i>	<i>Description</i>
FU1	Motor-pump fuse
FU2	Speed variator output protective fuse
FU3	Speed variator input protective fuse
FU4	Flashing light and working light (optional) protective fuse

3.2 - SAFETY CONTACT FUNCTIONS

<i>Reference</i>	<i>Description</i>
SB1	Line contactor / Chassis emergency stop button
SB2	Platform emergency stop button
SQ1	Tilt reset position switch
SQ3	Top position switch
SQ4	8 meter breaking position switch
SQ5/6	Pothole extension
SQ10	Tilt indicator
HL1	Speed variator fault light indicator
PT1	Speed variator fault numeric indicator

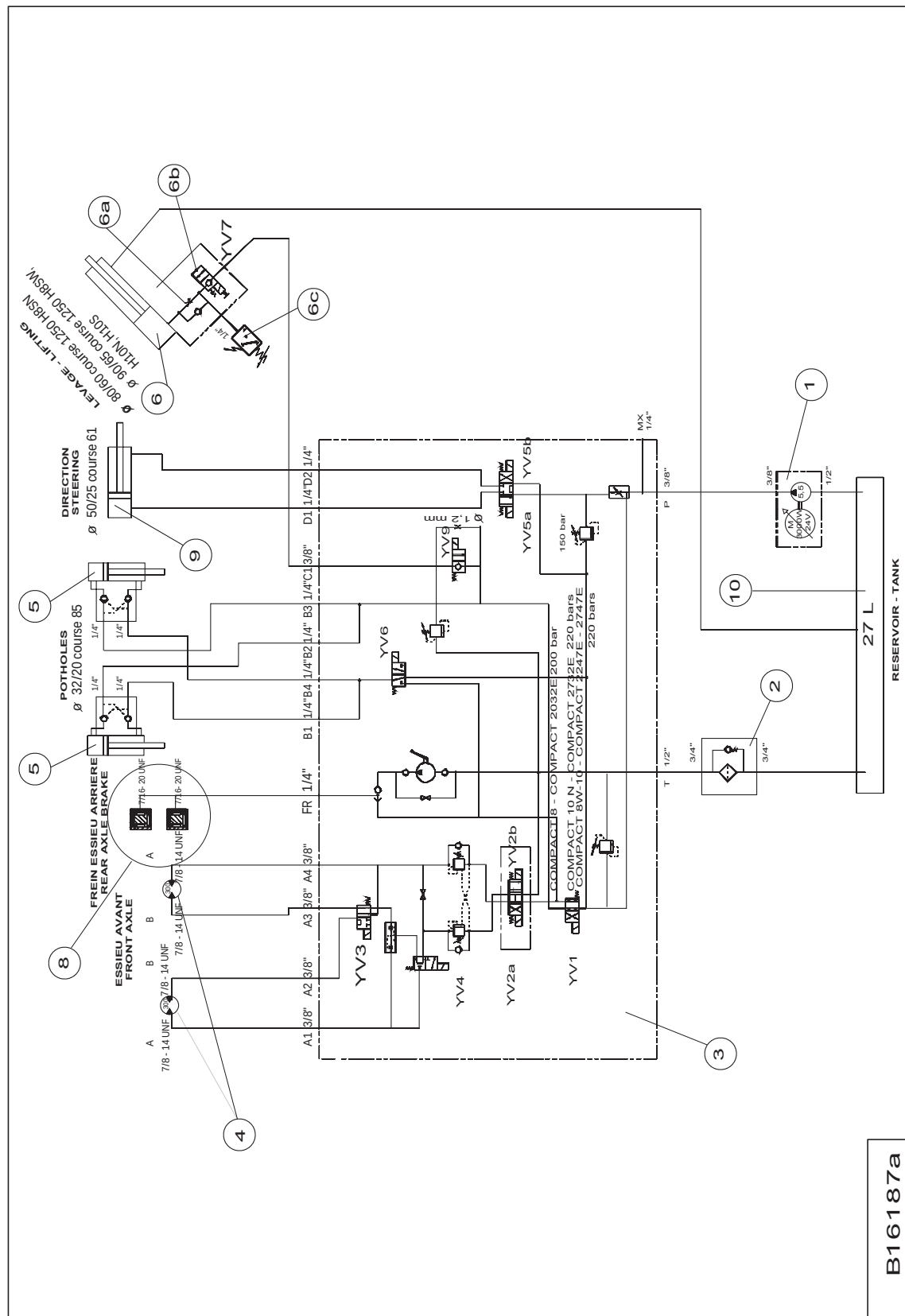
4 - WIRING DIAGRAMS

4.1 - WIRING DIAGRAM E 501 D

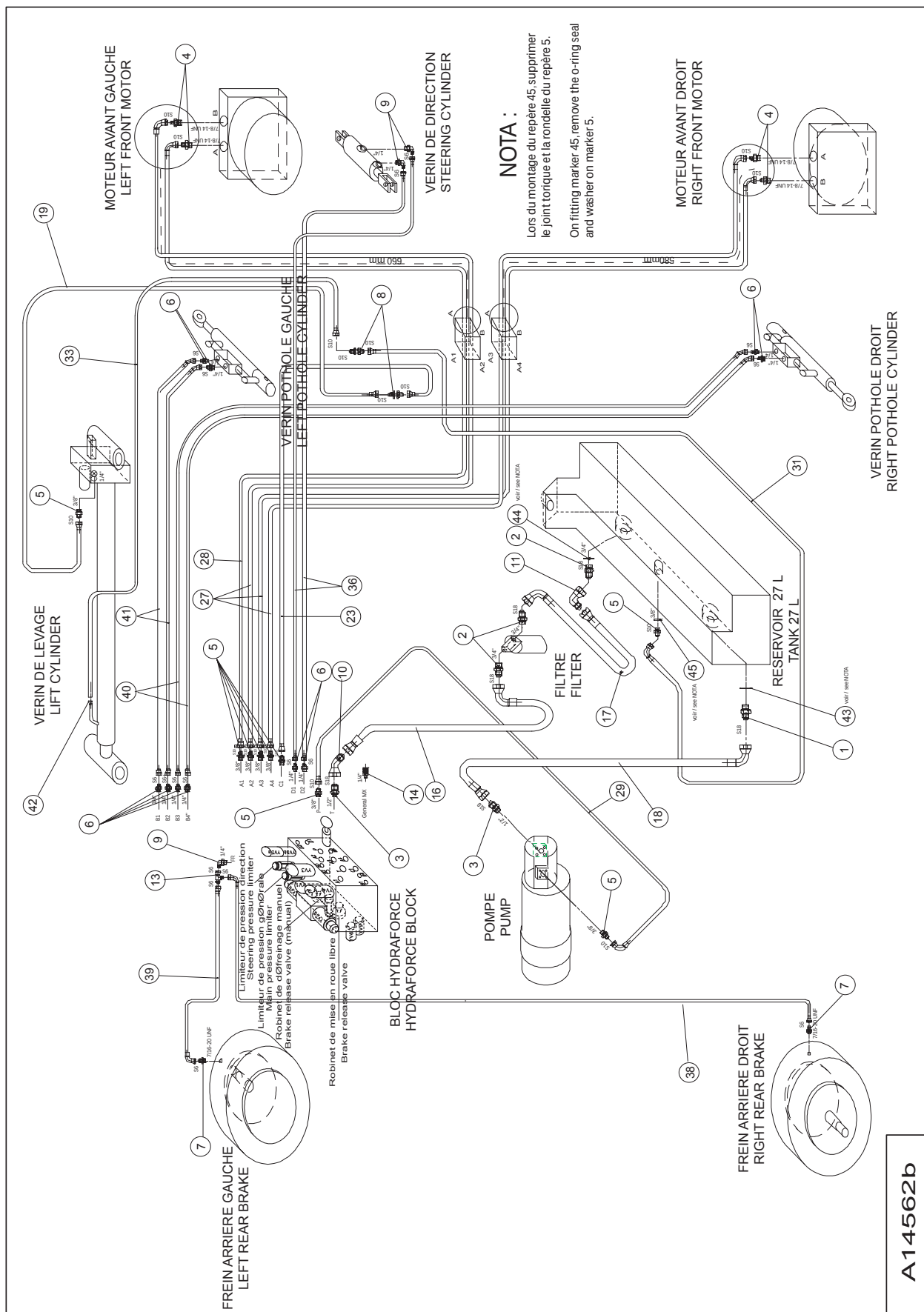


5 - HYDRAULIC DIAGRAMS

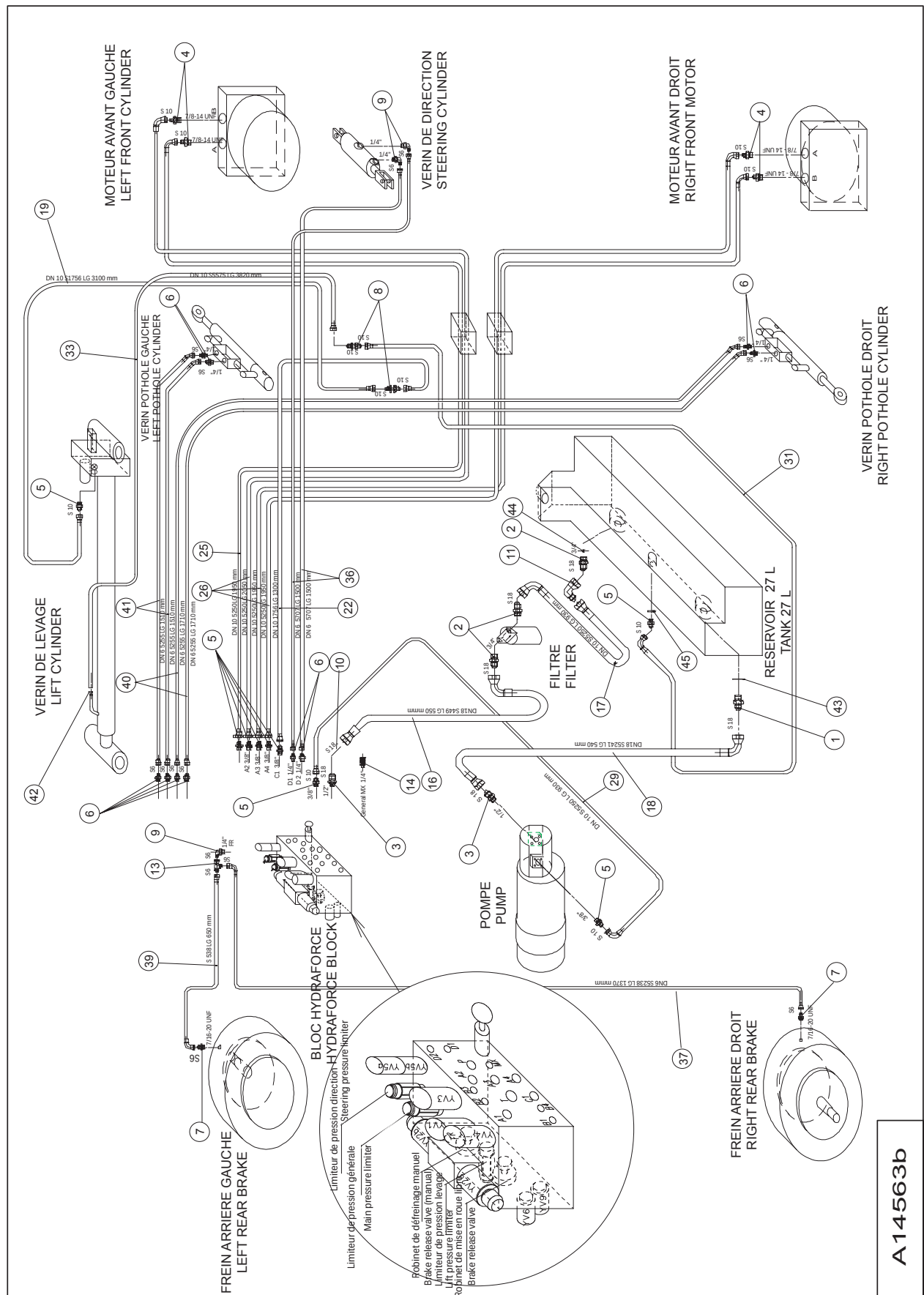
5.1 - HYDRAULIC DIAGRAM FOR COMPACT 8, 8W, 10N AND 10 MODELS (B16187A)



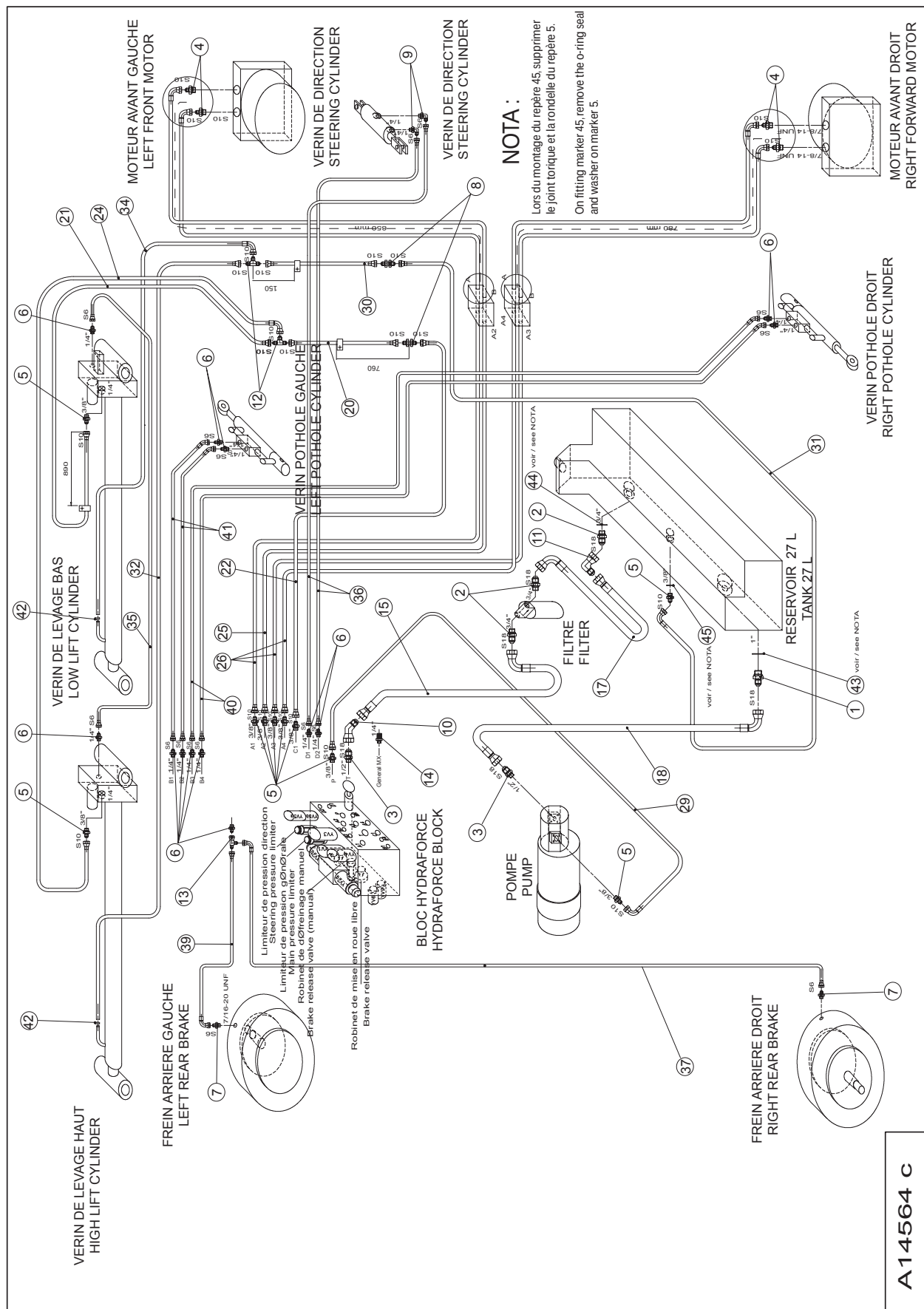
5.2 - HYDRAULIC INSTALLATION DIAGRAM FOR COMPACT 8 (A14562B)



5.3 - HYDRAULIC INSTALLATION DIAGRAM FOR COMPACT 8W, 10N AND 10 (A14563B)



5.5 - HYDRAULIC INSTALLATION DIAGRAM FOR COMPACT 12 (A14564C)



6 - MAINTENANCE

6.1 - GENERAL RECOMMENDATIONS

**Caution!**

Do not use the machine as a welding earth.

Do not weld without disconnecting the (+) and (-) battery terminals.

Do not start other vehicles with the batteries connected.

Servicing operations described in this manual are given for normal conditions of use.

In difficult conditions: extreme temperatures, high hygrometry, polluted atmosphere, high altitude, etc., certain operations must be carried out more frequently and specific precautions must be taken: consult the PINGUELY HAULOTTE After-Sales Service for information.

Only authorised and competent personnel may operate on the machine and must comply with the safety instructions related to Personnel and Environment protection.

Regularly check that the safety systems work properly:

1°) Tilt: buzzer + stop (travel and lifting disabled).

2°) Platform overload - load.

6.2 - MAINTENANCE DEVICE

The maintenance stand enables the operator to work under the machine in total safety.

Instructions: for the COMPACT 8, 10N (see:Photo 1, page 29)

Installing the maintenance stand:

- Position the elevation platform on a firm, horizontal floor.
- Ensure that the two emergency stop buttons are "ON".
- Turn the chassis ignition key to the "Chassis" position.
- Move the chassis lifting switch up to raise the platform.
- Turn the maintenance stand forwards and allow to hang vertically on the lower axle pivot tube.
- Push the lifting switch down to gradually lower the platform until the maintenance stand comes up against the lower pivot tube.

Removing the maintenance stand:

- Push the chassis lifting switch up and gradually lift the platform until the maintenance stand is free of the lower pivot tube.
- Turn the maintenance stand towards the back to bring it into its storage position on the cylinder fixture.
- Push the chassis lifting switch down and lower the platform completely.

Photo 1



Photo 2



Operating instructions: for the COMPACT 8W, 10, 12 (see: Photo 2, page 29)

These operations are to be carried out on both sides of the platform.

Putting the maintenance stand into place:

- Position the platform on a firm, horizontal floor.
- Ensure that the two emergency stop buttons are "ON".
- Turn the chassis ignition key to the "Chassis" position.
- Push the chassis lifting switch up to raise the platform.
- Unscrew and turn the maintenance stand and allow to hang vertically.
- Push the lifting switch down to lower the platform gradually until the maintenance stand comes up against the two fixing points (top and bottom).

Removing the maintenance stand:

- Push the chassis lifting switch up and gradually raise the platform until the maintenance stand is free.
- Turn the maintenance stand until it comes into its storage position and screw back into place.
- Push the chassis lifting switch down and lower the platform completely.

6.3 - ELECTRICITY SUPPLY

Photo 3



Operating instructions:

Cutting off the electricity supply:

Press the chassis emergency stop.

Starting the electricity supply:

Reset the emergency stop.

6.4 - MAINTENANCE PLAN

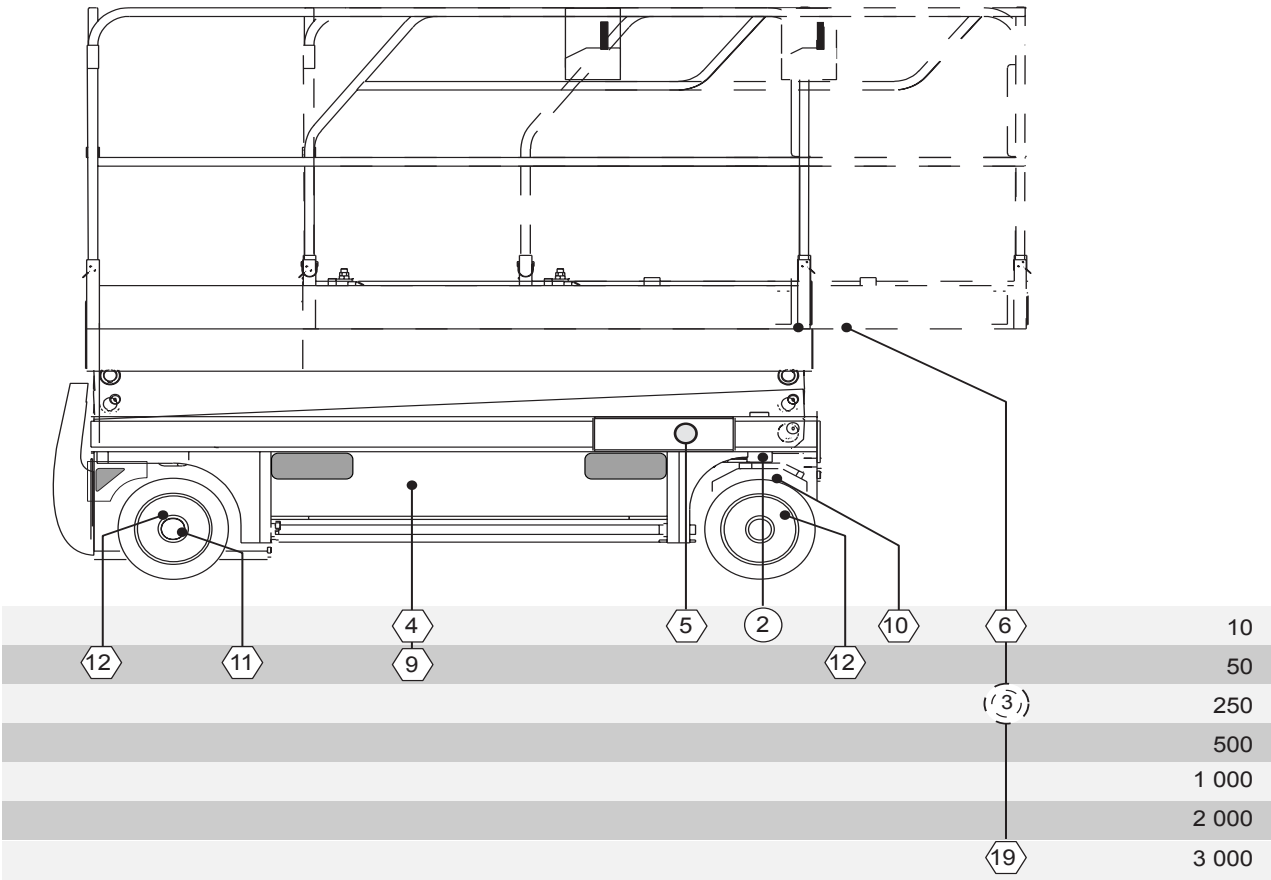
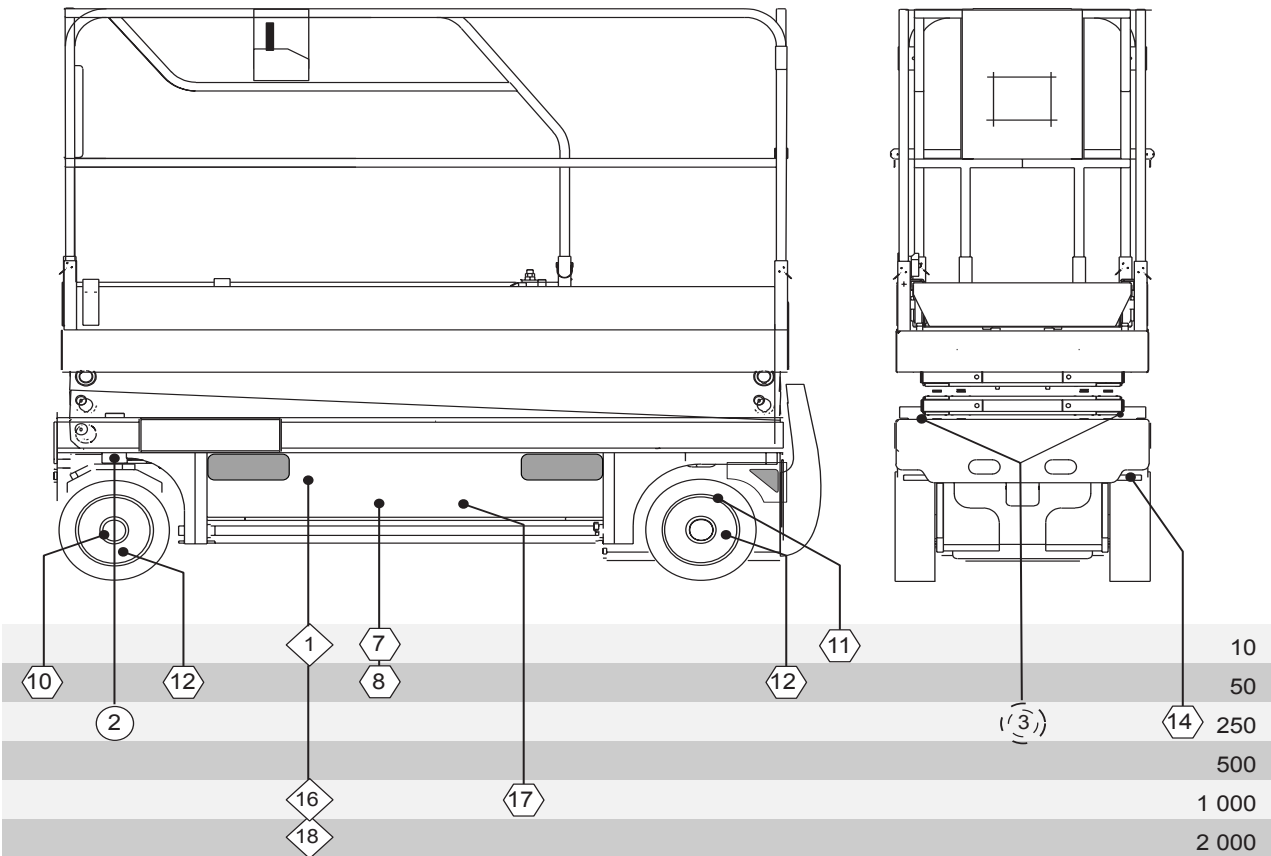
The plan (overleaf) indicates frequency, servicing points (device) and the consumables to be used.

- The reference in the symbol indicates the servicing point according to the frequency.
- The symbol represents the consumable to be used (or the operation to be performed).

6.4.1 - Consumables

Consumable	Specification	Symbol	Lubricants used by Pinguely-Haulotte	ELF	TOTAL
Gearbox oil	SAE 15W40		SHELL RIMULA - X		
Hydraulic oil	AFNOR 48602 ISO VG 46		BP SHF ZS 46	HYDRELF DS 46	EQUIVIS ZS 46
Organic hydraulic oil (optional)	ISO BIO 46				
Lithium grease	ISO-XM-2			CARDREXA DC1	
Lithium grease	ENS / EP 700			EPEXA 2	
Lead-free grease	Grade 2 or 3		ESSO GP GREASE	Multimotive 2	Multis EP 2
Exchange or specific operation					

6.4.2 - Maintenance diagram



6.5 - OPERATIONS**6.5.1 - Summary table**

FREQUENCY	OPERATIONS	REF
Every day or before each start of operation	• Check the levels:	1
	- hydraulic oil (see paragraph 7 -, sheet P001),	4
	- electric batteries	5
	- battery charge, using the indicator	
	• Check cleanliness:	
	- machine (in particular, check the tightness of connections and hoses), also check the condition of tyres, cables and all accessories and equipment.	6
	- platform slide for extension	7
	• Check hydraulic oil filter clogging.	
Every 50 hours	Pay attention for the first 50 hours:	8
	• Change the hydraulic oil cartridge (see 250 hours frequency).	9
	• Check the condition of battery cables (replace if worn)	
	• Check the tightness:	10
	- screws in general	11
	- front motor fixing screw 9 daNm	12
	- rear brake fixing screws 9 daNm	
	- wheel nuts (torque 110 daNm)	
Every 250 hours	• Change the hydraulic filter cartridge (see paragraph 7 -, sheet P002)	13
	• Grease:	2
	- steering wheel pivots (see paragraph 7 -, sheet P003)	3
	- the friction parts of the slides with a spatula (see paragraph 7 -, sheet P004)	
	• Check:	14
	- battery charger connection	15
	- battery level	
Every 500 hours or every 6 months	• If using organic hydraulic oil, empty the hydraulic tank.	16
Every 1000 hours or every year	• Empty the hydraulic oil tank	16
	• Clean the motor pump set carbon	17
Every 2000 hours	• Empty the hydraulic tank and whole hydraulic circuit.	18
Every 3000 hours or every 4 years	• Check:	
	- condition of the slides	19
	- condition of the electric cables, hydraulic hoses, etc.	20

REMINDER: All these frequencies must be reduced if working in difficult conditions (consult After-Sales if necessary).

6.6 - PRESENCE OF LABELS

It is important to check that the labels and plates warning personnel of the various dangers associated with using the machine are in good condition.

The labels providing operators with information on machine use and maintenance must also be checked.

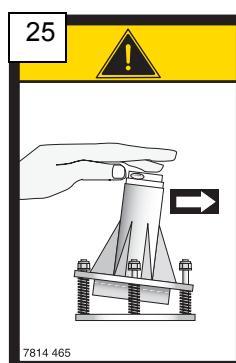
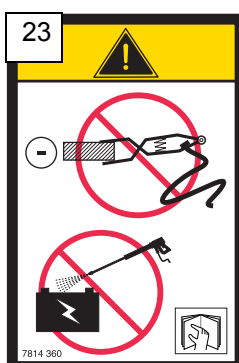
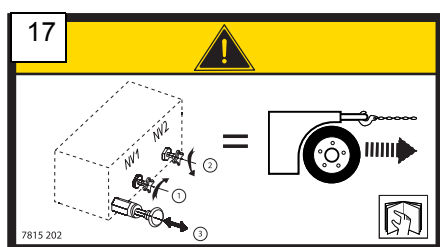
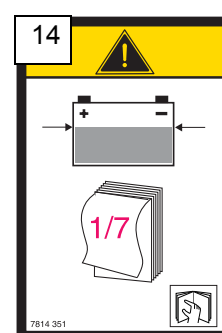
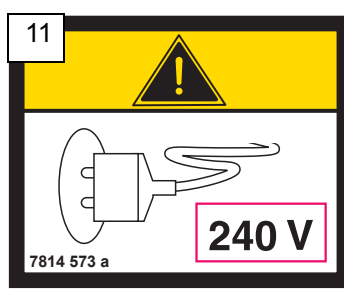
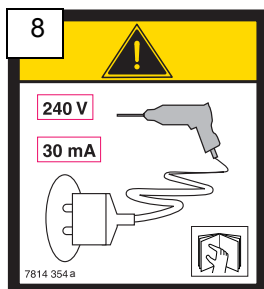
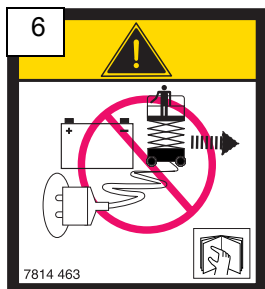
An illegible label may lead to incorrect or dangerous use of the machine.

Operating instructions:

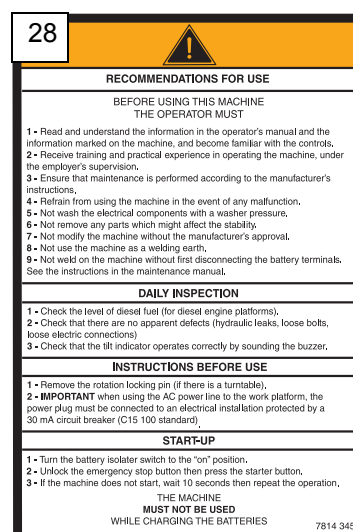
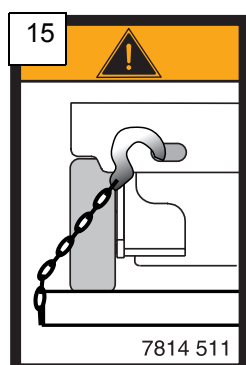
Check the presence of the labels:

Check that all the labels described below are legible and in the correct place. Replace if necessary (spare parts can be supplied on request, if necessary).

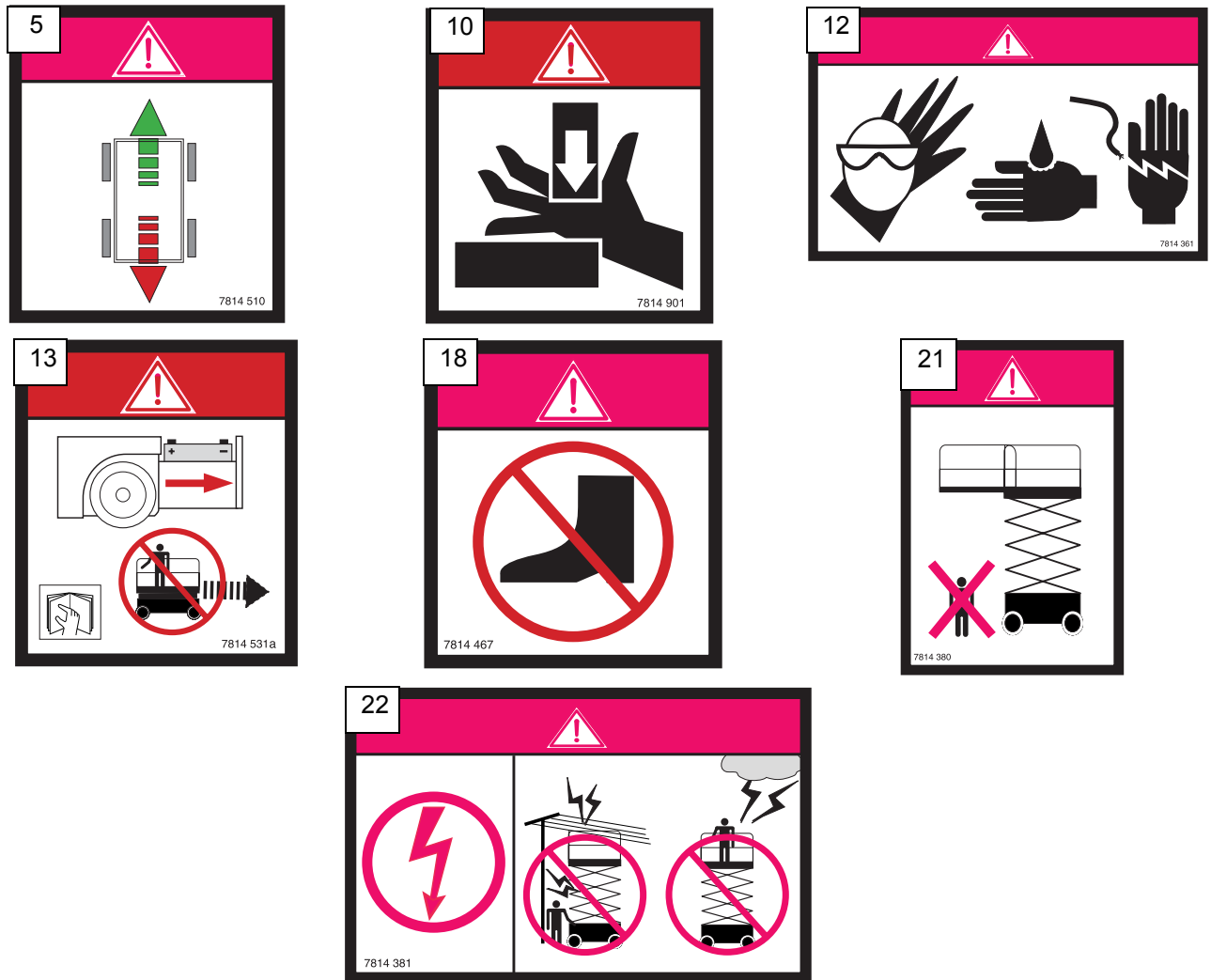
6.6.1 - Common "yellow" labels



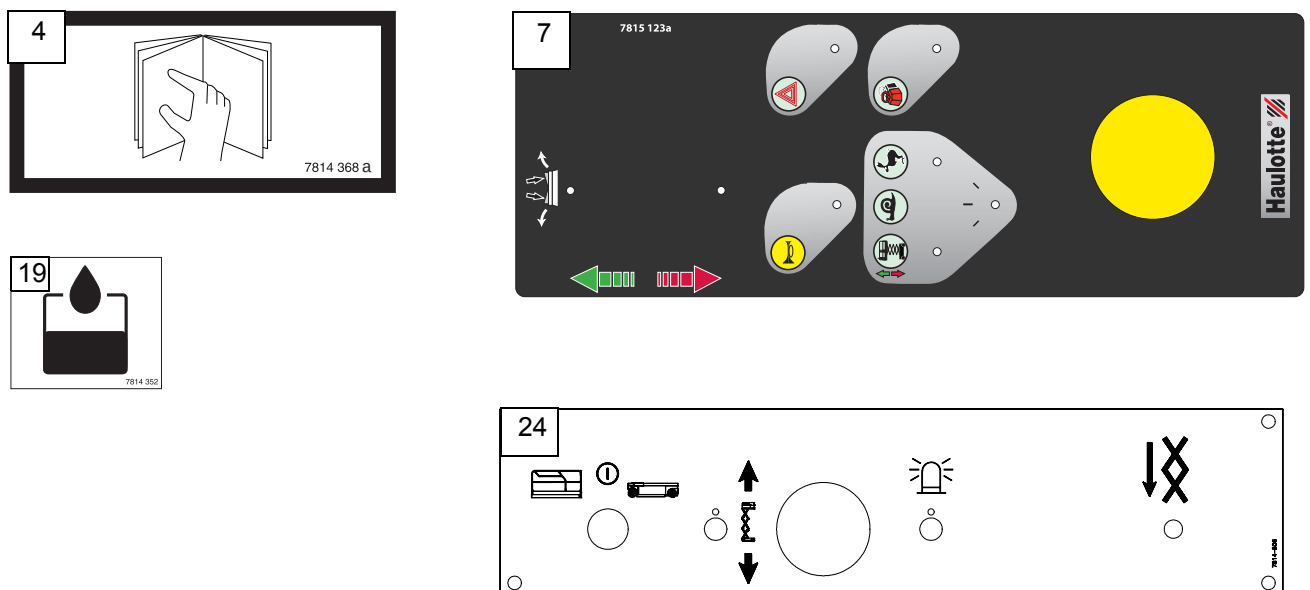
6.6.2 - Common "orange" labels



6.6.3 - Common "red" labels



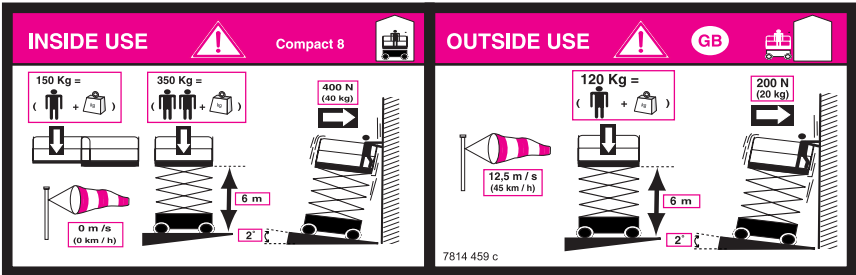
6.6.4 - Other common labels



6.6.5 - Labels specific to models

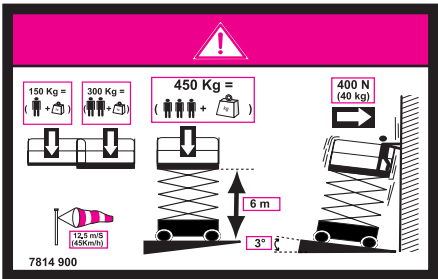
6.6.5.1 -Compact 8

3a



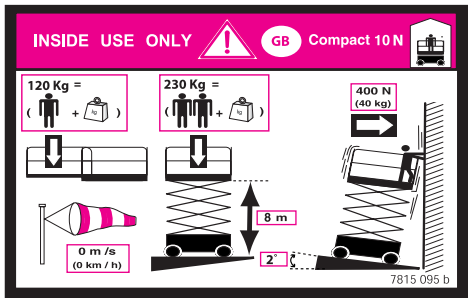
6.6.5.2 -Compact 8W

3b



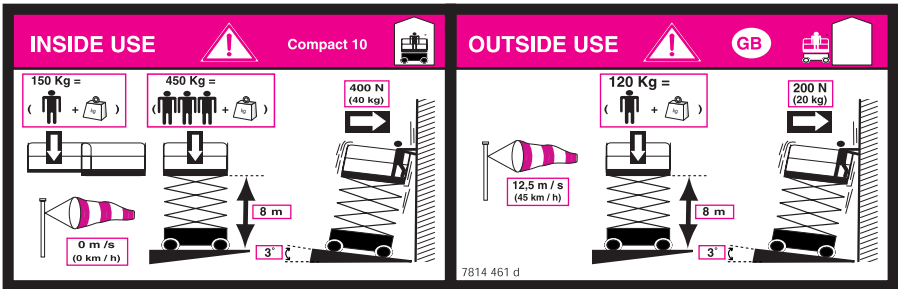
6.6.5.3 -Compact 10N

3c



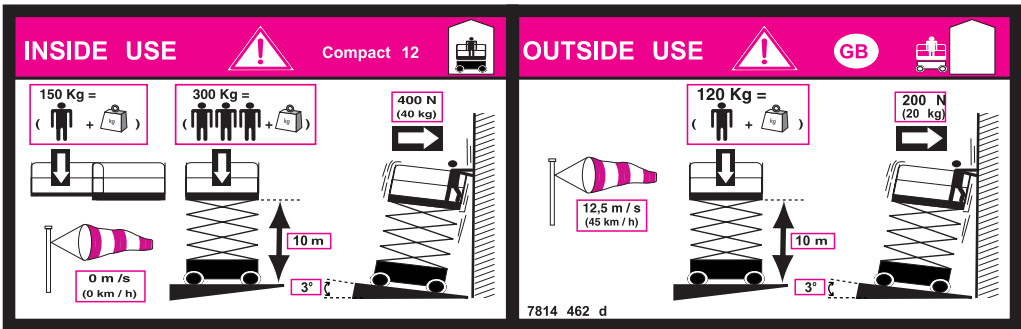
6.6.5.4 -Compact 10

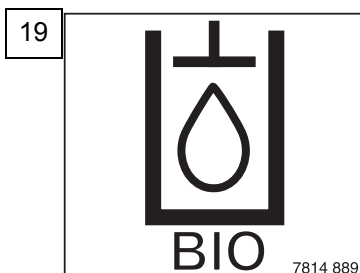
3d



6.6.5.5 -Compact 12

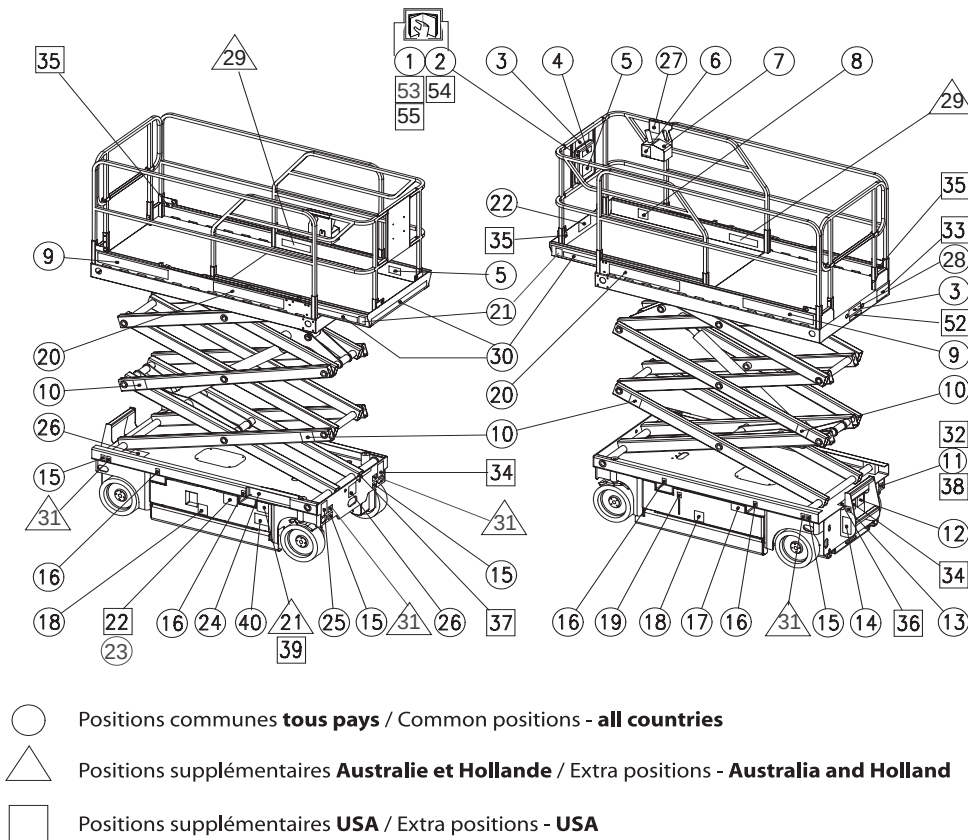
3e



6.6.6 - Labels specific : Option**6.6.6.1 -Organic hydraulic oil****6.6.7 - References of the machine's labels**

<i>Item</i>	<i>Code</i>	<i>Qty</i>	<i>Designation</i>
4	3078143680	1	Refer to the user's manual
5	3078145100	1	DANGER : direction of travel
6	3078144630	1	Risk of damage : do not use the machine during battery charging
7	3078151230	1	Information : Platform control panel label
8	3078143540	1	Information : 240V plug
9	3078145120	2	"Compact 8 " sticker
9	3078145130	2	"Compact 8W " sticker
9	3078150900	2	"Compact 10N" sticker
9	3078145140	2	"Compact 10 " sticker
9	3078145150	2	"Compact 12 " sticker
10	3078149010	4	Risk of crushing of upper limbs (hands/fingers)
11	3078145730	1	Information : 240V plug
12	3078143610	1	Risk of injury : wear protective clothing
13	3078145310	1	Risk of overturning : Lock the battery tray before using the machine
14	3078143510	1	Risk of damage : servicing of batteries
15	3078145110	4	Information : Anchoring hook location.
16	3078143830	4	Information : Fork-lift truck fork location.
17	3078152020	1	Procedure : freewheeling - brake release
18	3078144670	2	Risk of crushing : crushing of feet (potholes)
19	3078143520	1	Information : Hydraulic oil
19	3078148890	1	Organic hydraulic oil (option)
20	3078148770	2	" HAULOTTE " logo
21	3078143800	2	Risk of crushing, do not park in the machine's work area
22	3078143810	1	Electrical risk: This machine is not isolated
23	3078143600	1	Electrical risk: Do not use the machine as a welding earth. Do not wash...
24	3078145060	1	Information : bottom panel label
25	3078144650	1	Risk of overturning : verification of tilt
27	3078144710	1	Stop time during lowering (English)
28	3078149610	1	Information : operating instructions (English)
3a	3078144590	1	8 floor height + load capacity
3b	3078149000	1	8W floor height + load capacity
3c	3078150950	1	10N floor height + load capacity
3d	3078144610	1	10 floor height + load capacity
3e	3078144620	1	12 floor height + load capacity

6.6.8 - Label positioning on the machine



D16106c

6.7 - PRESENCE OF MANUALS

It is important to ensure that the manuals supplied with the machine are in good condition and stored in the document holder provided on the platform.

An illegible manual may lead to incorrect or dangerous use of the machine.

Operating instructions:

Check presence of manuals:

Check that all the manuals are legible, complete and stored in the document holder provided on the platform. Replace if necessary (extra copies can be supplied on request by the manufacturer).

7 - PREVENTIVE MAINTENANCE SHEETS

List of preventive maintenance sheets:

<i>Sheet no.</i>	<i>Description</i>
P001	Checking - filling the hydraulic oil tank
P002	Replacing the hydraulic filter cartridge
P003	Greasing the steering wheel pivots
P004	Greasing the slides

SHEET P001	PREVENTIVE MAINTENANCE SHEET	Sheet 1/1
	CHECKING THE HYDRAULIC OIL TANK LEVEL	

1 - Preliminary operations

- Put the machine in the low position and maintenance configuration (see § 6.2, page 27).

Caution !
Ensure that oil temperature is not too high.

NOTA : Do not use the maintenance stands, leave the platform in the low position.

- Cut off the electric power supply (see § 6.3, page 28).

2 - Checking the hydraulic oil tank level

- Ensure that the oil level in the tank is sufficient.
- Top up if necessary.

NOTA : Only use the oil recommended by the manufacturer.



MAX MIN

- Put the machine back into operational configuration.



OIL LEVEL

	PREVENTIVE MAINTENANCE SHEET	

SHEET P002	PREVENTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING THE HYDRAULIC FILTER CARTRIDGE	



Caution !
*Ensure that oil temperature
 is not too high.*

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 27).
- Cut off the electric power supply (see § 6.3, page 28).

2 - Replacing the hydraulic filter cartridge

- Unscrew the body and remove the hydraulic filter cartridge.
- Screw a new cartridge into place.
- Put the machine back into the operational configuration.



Compact



Optimum

	PREVENTIVE MAINTENANCE SHEET	

SHEET P003	PREVENTIVE MAINTENANCE SHEET	Sheet 1/1
	GREASING THE STEERING WHEEL PIVOTS	

1 - Greasing the steering wheel pivots

- Cut off the electric power supply (see § 6.3, page 26).
- Grease the pivots.

NOTA : Only use the grease recommended by the manufacturer.

- Put the machine back into the operational configuration



Compact, optimum, previous design



Compact, optimum, current design



Star 22J / Star 8

	PREVENTIVE MAINTENANCE SHEET	

<i>SHEET P004</i>	PREVENTIVE MAINTENANCE SHEET	Sheet 1/1
	GREASING THE SLIDES	

1 - Preliminary operations



- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Greasing the slides

- Grease the slides using a spatula.

NOTA : *Only use the grease recommended by the manufacturer.*

- Put the machine back into the operational configuration.

	PREVENTIVE MAINTENANCE SHEET	

8 - OPERATING INCIDENTS

8.1 - TABLE OF INCIDENTS

Before anything else, check that:

- the batteries are charged; the green light indicators should be on.
- the two "palm button" emergency stops on the chassis control box and on the platform control box are unlocked.
- the oil level in the tank is OK.



Caution!

**Bubbles + pressure + heat =
unacceptable situation.
Risk of explosion**

NB:

Cavitation (emulsified oil) may cause incorrect operation of hydraulic components. It takes approximately 4 hours for oil that has been emulsified under the effects of cavitation to get back to its normal condition.

8.1.1 - General operation

ANOMALY	CHECK	PROBABLE CAUSE	SOLUTION
No movement		• Defective batteries • Oil level low • Defective fuses • Defective chassis emergency stop • Defective platform emergency stop • Defective wiring harness • Defective motorpump set • Defective printed circuit • Defective control unit	SHEET DP007
Hydraulic pump noisy		• Insufficient oil in the tank • Defective pump	SHEET DP009
Pothole system does not extend when the platform is raised		• Defective speed variator • Defective wiring harness • Defective electrovalve YV6 coil • Defective electrovalve YV6 • Defective pothole cylinders	SHEET DP013
No movement from the platform control station		• Defective key switch SA1 • Defective electric wiring harness • Defective speed variator • Defective manipulator • Defective printer circuit U2	SHEET DP014
Hydraulic pump cavitation (Vacuum in the pump due to insufficient oil).	The hydraulic oil becomes cloudy and white (with bubbles)	• Oil viscosity too high	• Empty the circuit and refill with the recommended oil.

ANOMALY	CHECK	PROBABLE CAUSE	SOLUTION
Overheating of the hydraulic circuit		- Oil viscosity too high - Insufficient hydraulic oil in the tank	Empty the circuit and replace with the recommended oil. Top up with oil as necessary.
The system works irregularly		The hydraulic oil is not at optimum operating temperature	Make some movements without load to enable the oil to heat up

8.1.2 - Platform lifting system

ANOMALY	CHECK	PROBABLE CAUSE	SOLUTION
No up or down movement from the platform control		- Defective wiring harness - Defective printed circuit U2 - Defective manipulator - Defective platform emergency stop button - Defective speed variator	SHEET DP001
No up or down movement from the chassis control		- Defective key switch - Defective wire no. 10 - Defective switch SA2 - Defective speed variator	SHEET DP002
No up movement from the chassis or platform controls		- Hydraulic leak - Defective wiring harness - Defective electrovalve YV1 coil - Defective lifting cylinder - Defective electrovalve YV1 - Defective or badly adjusted limiter - Defective tilt detector - Defective speed variator - Defective end of stroke contactor	SHEET DP003
No down movement from the platform or chassis controls		- Defective wiring harness - Badly adjusted or defective pressure contact SP1 - Defective electrovalve YV7 coil - Defective electrovalve YV7 - Defective speed variator	SHEET DP004
The platform (above 1.5m) comes down slowly by platform or chassis controls		- Defective electrovalve YV8 or YV9 coil - Defective electrovalve YV8 or YV9 - Defective electric wiring harness - Defective speed variator	SHEET DP005
The platform moves up and down with a jerky movement		Insufficient oil in the hydraulic circuit	Top up with oil as necessary

8.1.3 - Travel system

ANOMALY	CHECK	PROBABLE CAUSE	SOLUTION
No travel movement in either direction, FORWARD or BACKWARD		• No movement available • Defective pothole cylinder • Defective wiring harness • Defective pothole end of stroke contactor • Defective brake • Defective motor	SHEET DP006
No travel in one direction, FORWARD or BACKWARD		• Defective speed variator • Defective wiring harness • Defective YV2a or YV2b coil	SHEET DP010
High speed unavailable below 1.5m		• Defective electrovalve YV3 or YV4 coil • Defective electrovalve YV3 or YV4 • Defective wiring harness • Defective printed circuit U2 • Defective speed selector switch SA3	SHEET DP011
Only micro-speed is available below 1.5m		• Defective speed variator • Defective electric wiring harness • Defective contactor SQ1	SHEET DP012
The machine goes into runaway downhill		• Balancing valve incorrectly set or not working properly	• Replace the balancing valve.

8.1.4 - Steering system

ANOMALY	CHECK	PROBABLE CAUSE	SOLUTION
No steering		• Hydraulic leak • No lifting • Defective printed circuit U2 • Defective electrovalve YV5a or YV5b coil • Defective electrovalve YV5 • Defective wiring harness • Defective manipulator • Defective steering cylinder • Defective steering pressure limiter	SHEET DP008

8.1.5 - List of MDI codes

Numeric indicator	Flash	Description
0		0 on M.D.I + red led: Battery below 5% or speed variator inoperative
AL 01 (see NB)	3	Supply voltage of YV7, YV9 and wire no. 3 (input B+, check that wires 100 & 3 are not inverted) /Incorrect connection of wire 26 if all light indicators are on and fault 01 speed variator inoperative
AL 06	6	Serial card or cable or supply plug of the top station (wire no. 58 / MDI cabling or MDI / 7-wire wiring harness (37 ; B5 / 38 ; B5 / 39. A 3 / 40 ; B1 / 41 ; B12 / 51 ; A7 / 52 ; A6 /
AL 13	6	EEPROM problem (Speed variator inoperative)
AL 32	3	Low idle VMN or incoherent with the applied PWM (speed variator inoperative)
AL 37	4	Mains switch stuck (auxilliary contact of the battery set open or inoperative)
AL 38	4	Mains switch open by the control microswitch (battery cut-off inoperative)
AL 49	5	I=0 A EVER Current always zero in operation (speed variator inoperative)
AL 53	5	High idle current (speed variator inoperative)
AL 60	3	The capacitors do not start to charge on key. (250A fuse / motor connections)
AL 62	9	Speed variator temperature too high (> 75° speed variator inoperative)
AL 66	8	Discharged battery
AL 73	1	Short-circuit on electrovalve, the mains switch or buzzer
AL 74	4	Mains switch pilot in short-circuit (switch coil or variator problem) (wire 19 on terminal 9 disconnected, MAV on hydraulic block) (speed variator inoperative if the relay sticks immediately) (charger starter plug incorrectly connected)
AL 75	4	Mains switch pilot does not close (switch coil or speed variator problem)
AL 78	2	Accelerator up when idle (joystick problem). Check the potentiometer supplied with 51 / 52 output 39
AL 79	2	Incorrect start sequence (joystick connection)
AL 80	2	Double start request (serial card or joystick)
AL 90		YV6 coil inoperative or incorrectly connected (wires 25 / 7 theoretical resistance 75 ohms) (inversion of wires 25 & 27 at terminals 18 & 18)
AL 93		Drivers 2KO SIC Problem with small wiring harness between MDI and bottom station control panel
AL 94	6	The control microswitch does not respond correctly to the SIEMENS micro (speed variator inoperative) If horn is quiet, change the coil mains switch in DC
AL 95	7	Pressure switch alarm

Numeric indicator	Flash	Description
AL 98	0	Disagreement between the speed variator and MDI timers* Auxiliary contact of chassis emergency stop inoperative
AL 99	6	Programmed handling request

NB: If no situation and red and green (last) light indicators are on, SPEED VARIATOR is INOPERATIVE.

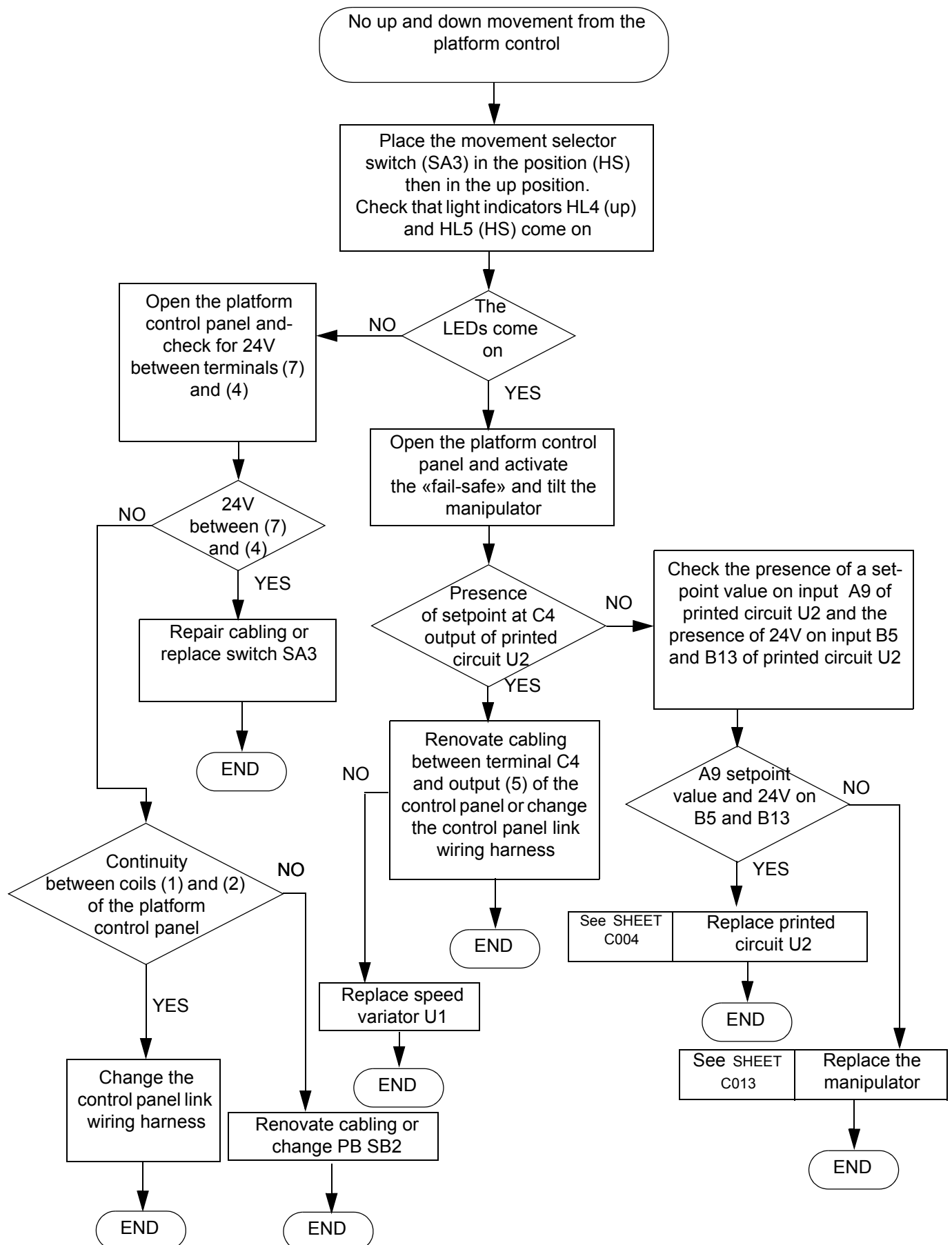
Alarm 01:- if all the green light indicators are on = speed variator inoperative

- Check YV7 connector
- Disconnect the plug on electrovalve YV7
- Take YV1 coil for testing
- The fault disappears = replace coil / the fault does not disappear
- Disconnect the plug connecting with the chassis wiring harness
- Check the pin of wire 26 for incorrect connection
- Tests

Alarm 98 :- when replacing the speed variator or MDI, this code may appear when restarting the machine. In this case, leave the machine live for approximately 1/4 hour, to allow the speed variator to re-establish communication with the M.D.I.

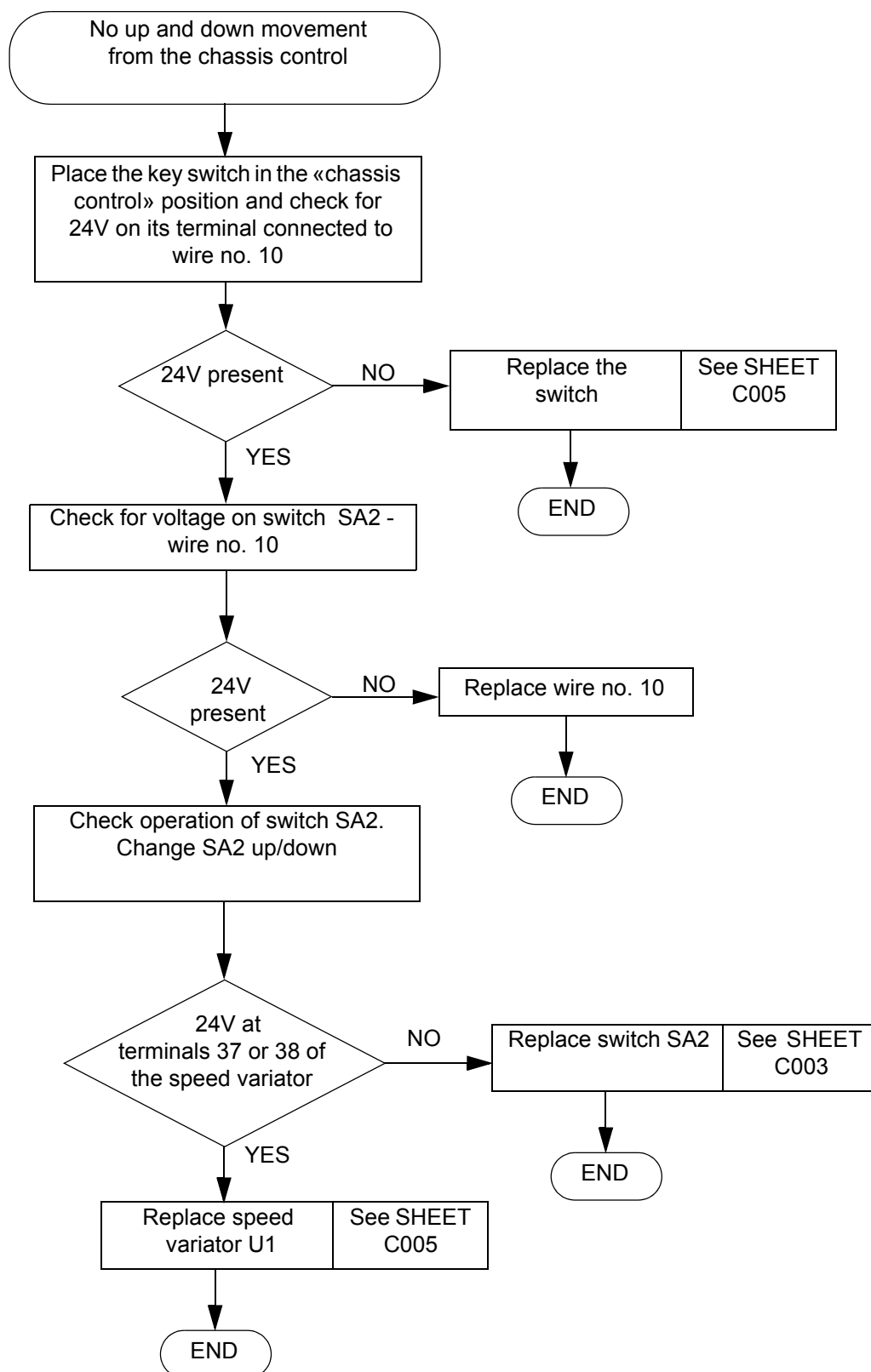
8.2 - FAILURE DETECTION FLOW CHARTS

SHEET DP001	FAILURE DETECTION FLOW CHART	Sheet 1/2
	NO UP AND DOWN MOVEMENT FROM THE PLATFORM CONTROL	



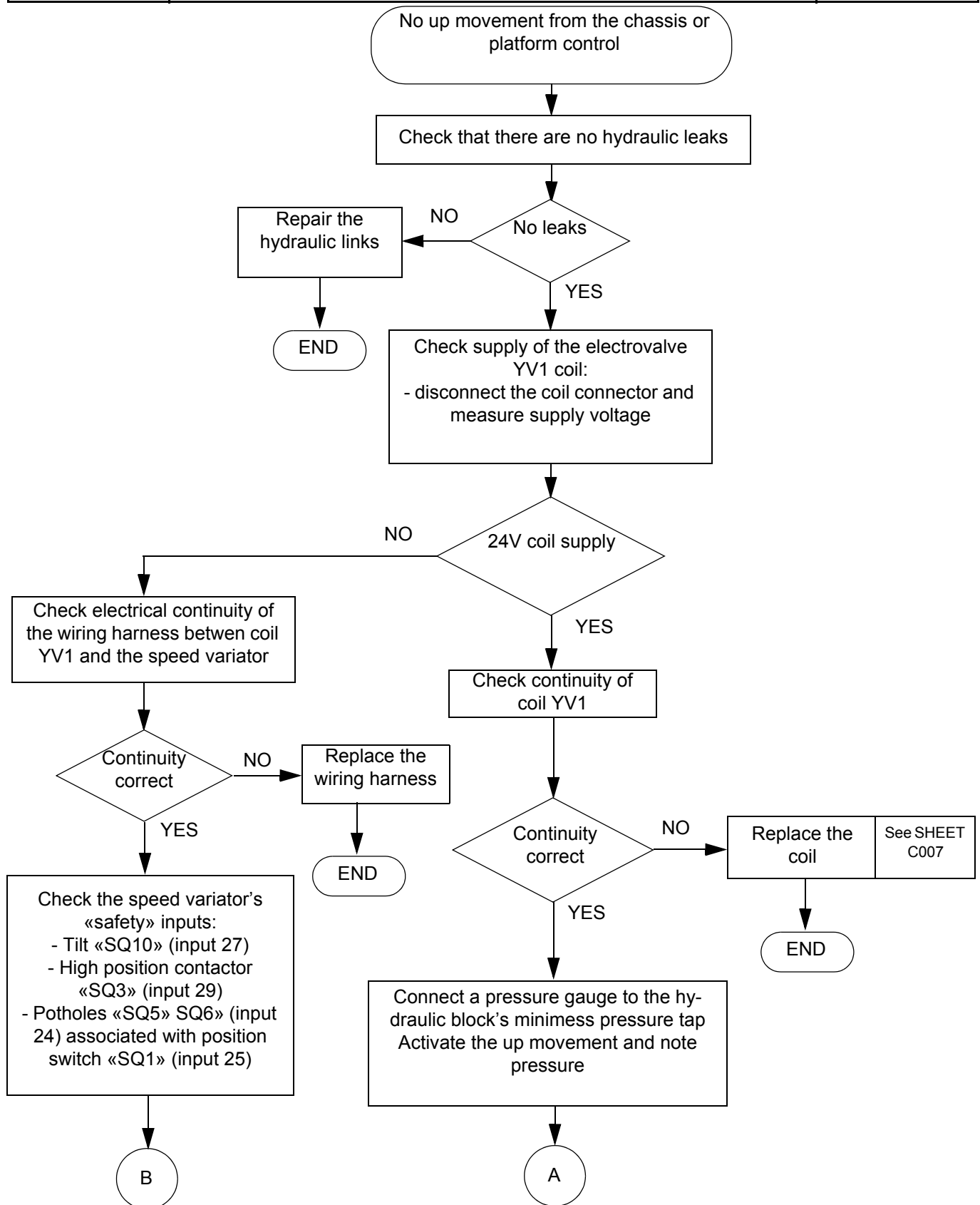
SHEET DP001	FAILURE DETECTION FLOW CHART	Sheet 2/2
	NO UP AND DOWN MOVEMENT FROM THE PLATFORM CONTROL	

SHEET DP002	FAILURE DETECTION FLOW CHART	Sheet 1/2
	NO UP AND DOWN MOVEMENT FROM THE CHASSIS CONTROL	

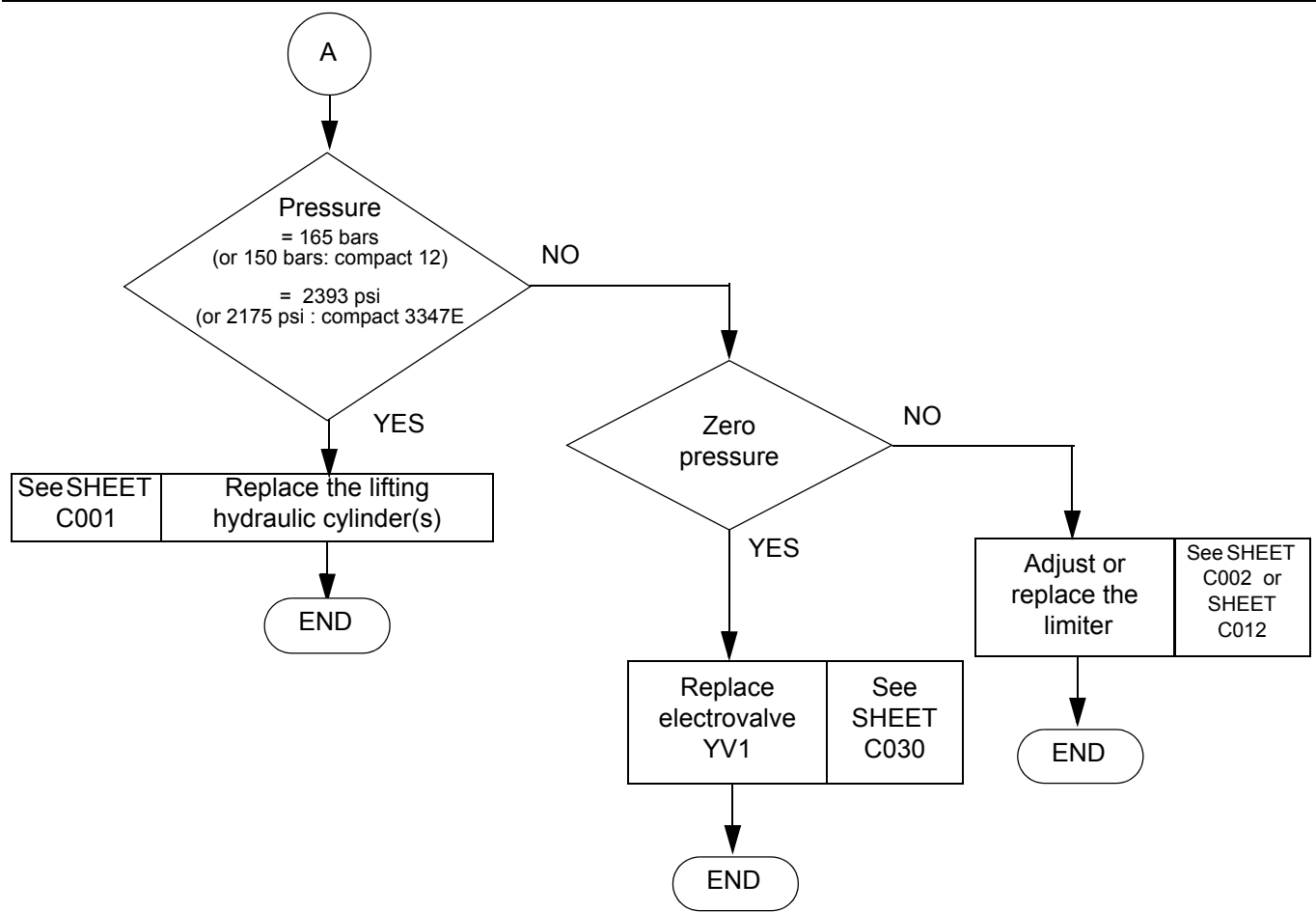


SHEET DP002	FAILURE DETECTION FLOW CHART	Sheet 2/2
	NO UP AND DOWN MOVEMENT FROM THE CHASSIS CONTROL	

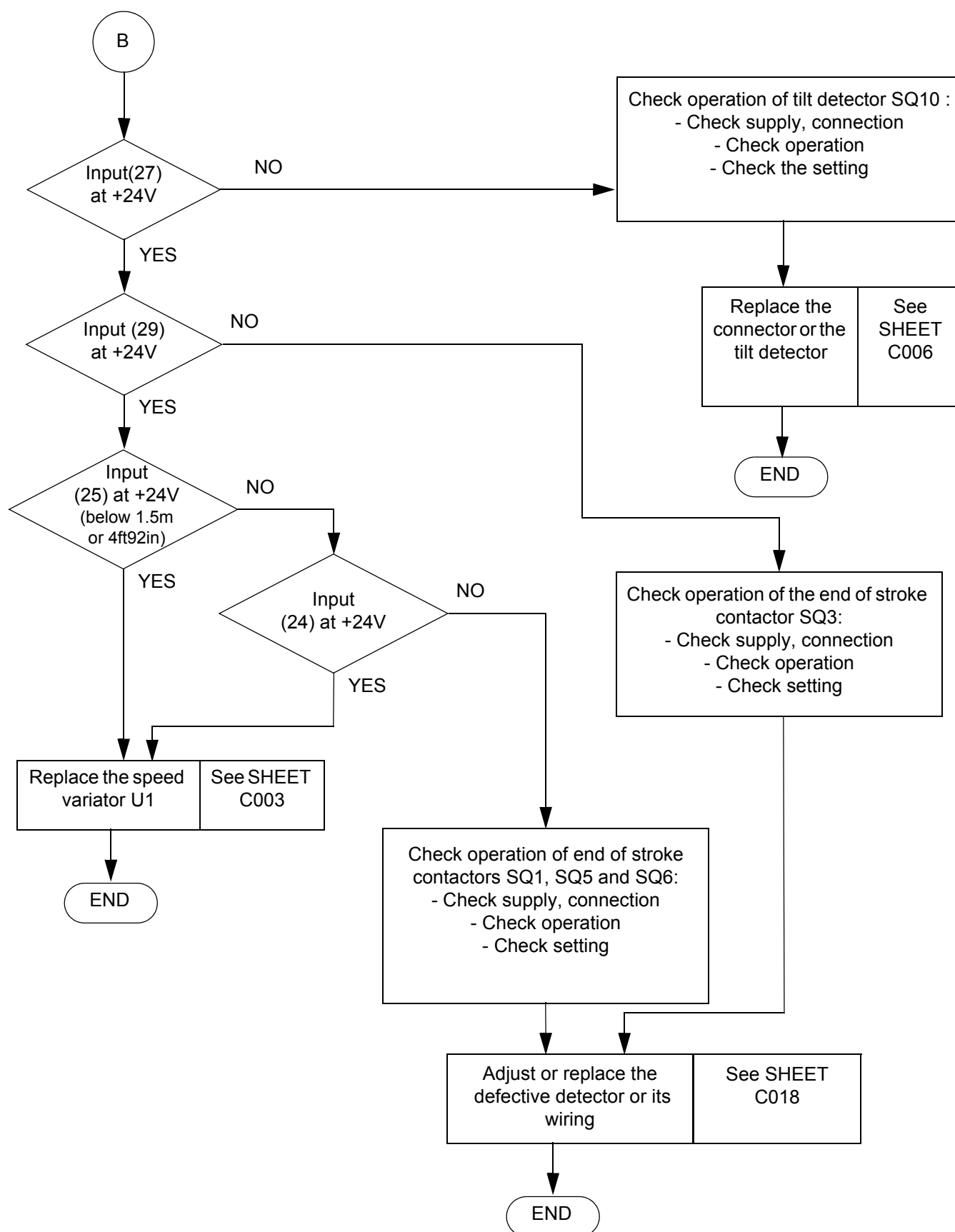
SHEET DP003	FAILURE DETECTION FLOW CHART	Sheet 1/4
	NO UP MOVEMENT FROM THE CHASSIS OR PLATFORM CONTROL	



SHEET DP003	FAILURE DETECTION FLOW CHART	Sheet 2/4
	NO UP MOVEMENT FROM THE CHASSIS OR PLATFORM CONTROL	

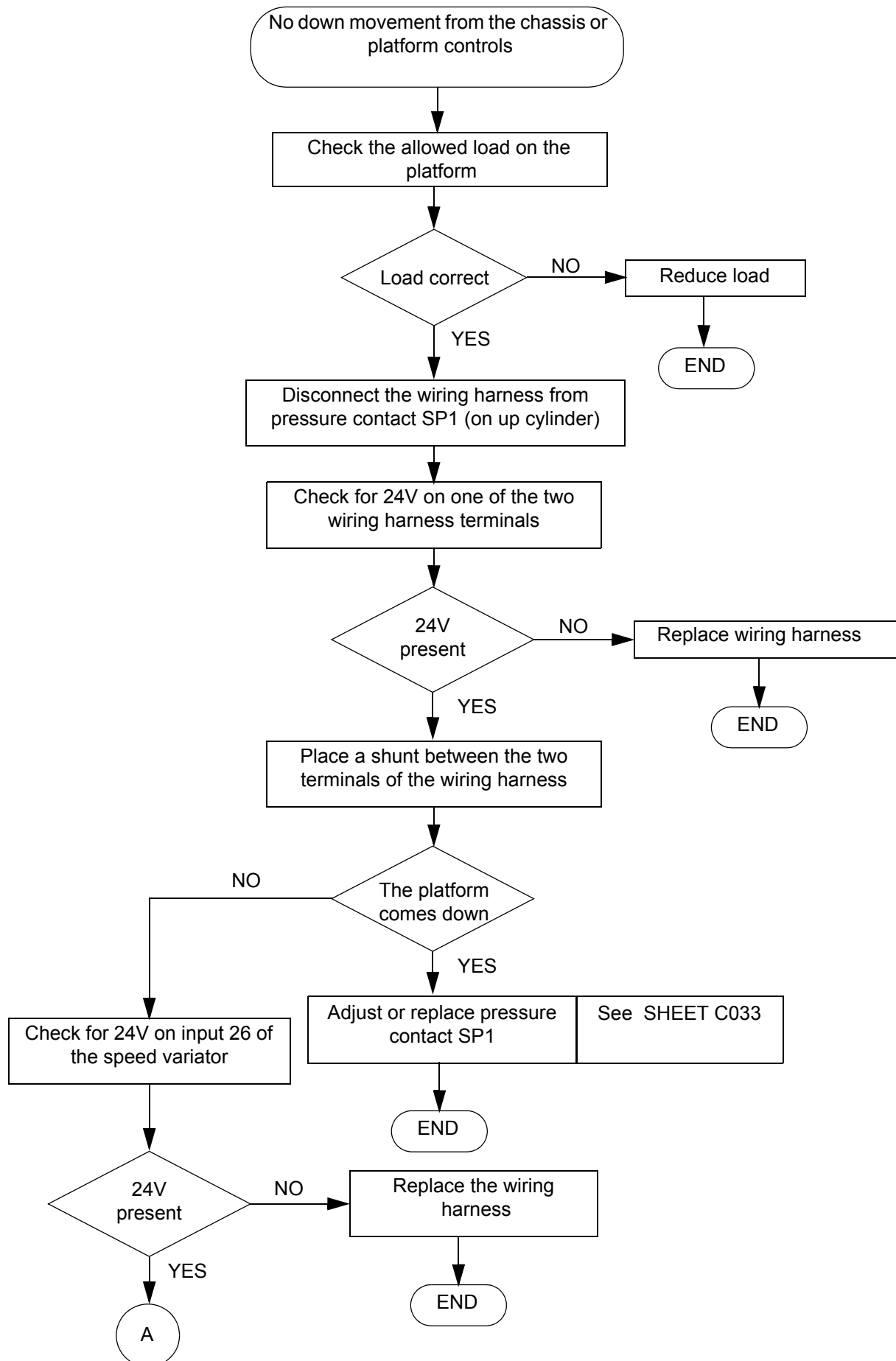


SHEET DP003	FAILURE DETECTION FLOW CHART	Sheet 3/4
	NO UP MOVEMENT FROM THE CHASSIS OR PLATFORM CONTROL	

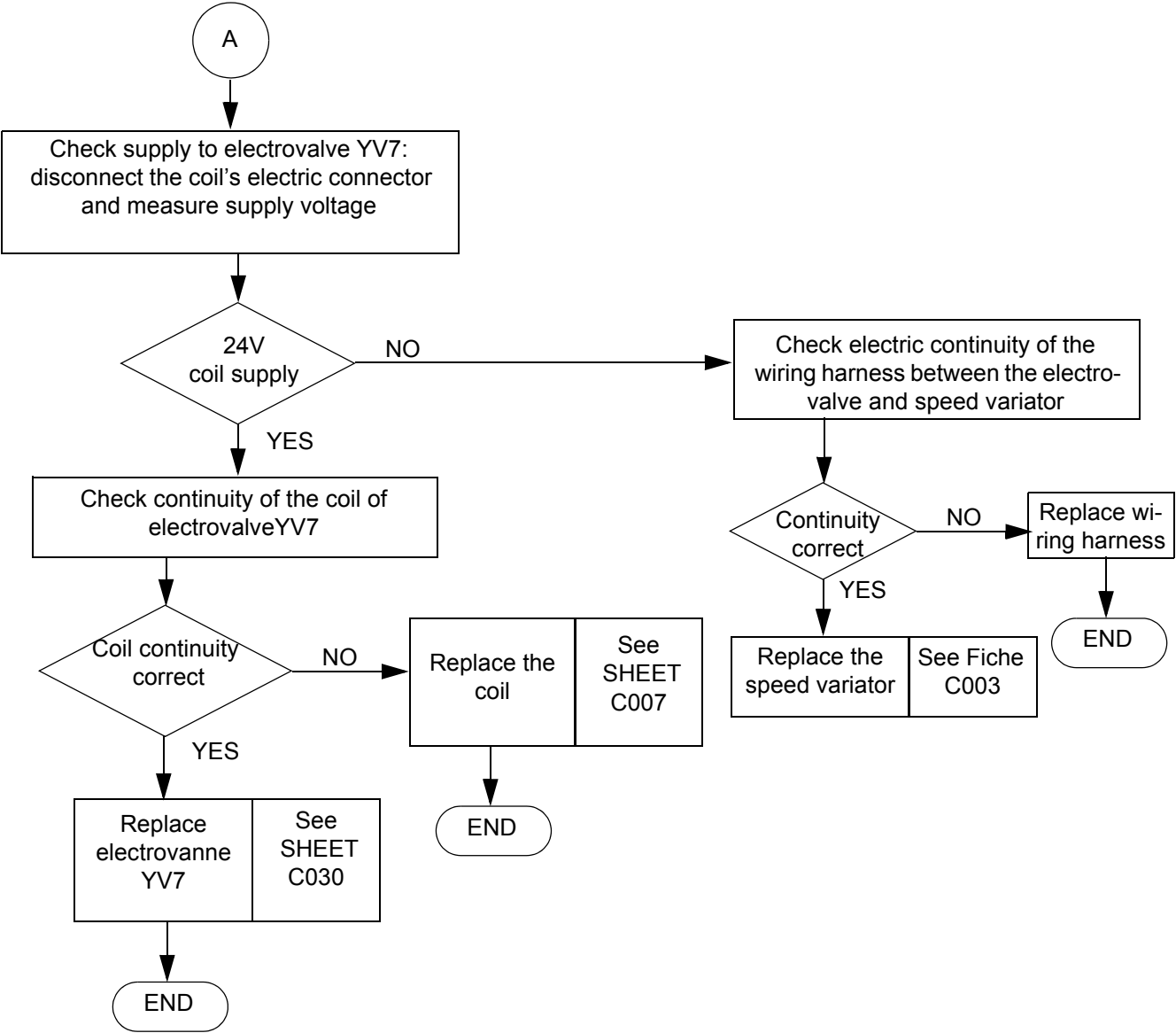


SHEET DP003	FAILURE DETECTION FLOW CHART	Sheet 4/4
	NO UP MOVEMENT FROM THE CHASSIS OR PLATFORM CONTROL	

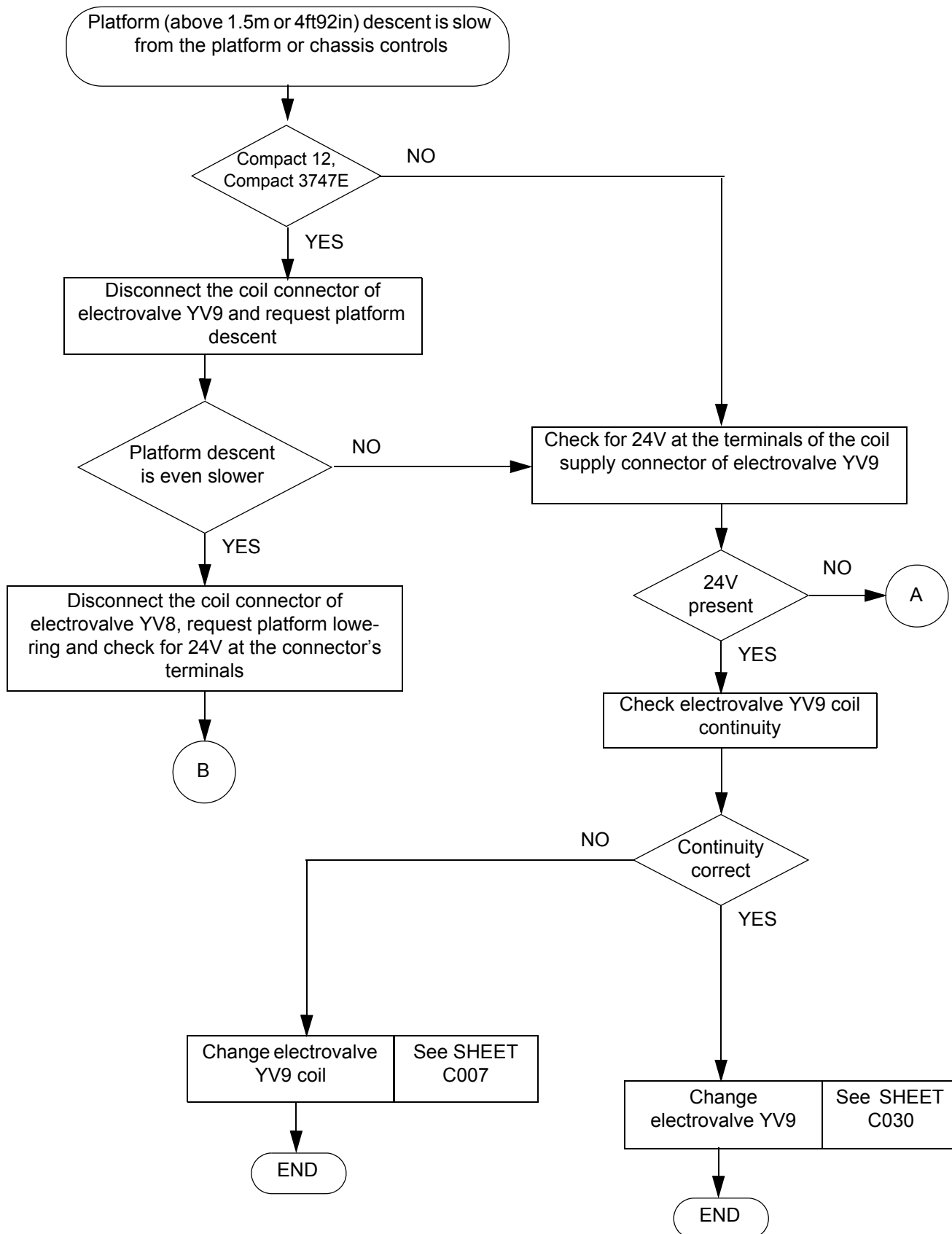
SHEET DP004	FAILURE DETECTION FLOW CHART	Sheet 1/2
	NO DOWN MOVEMENT FROM THE PLATFORM OR CHASSIS CONTROL	



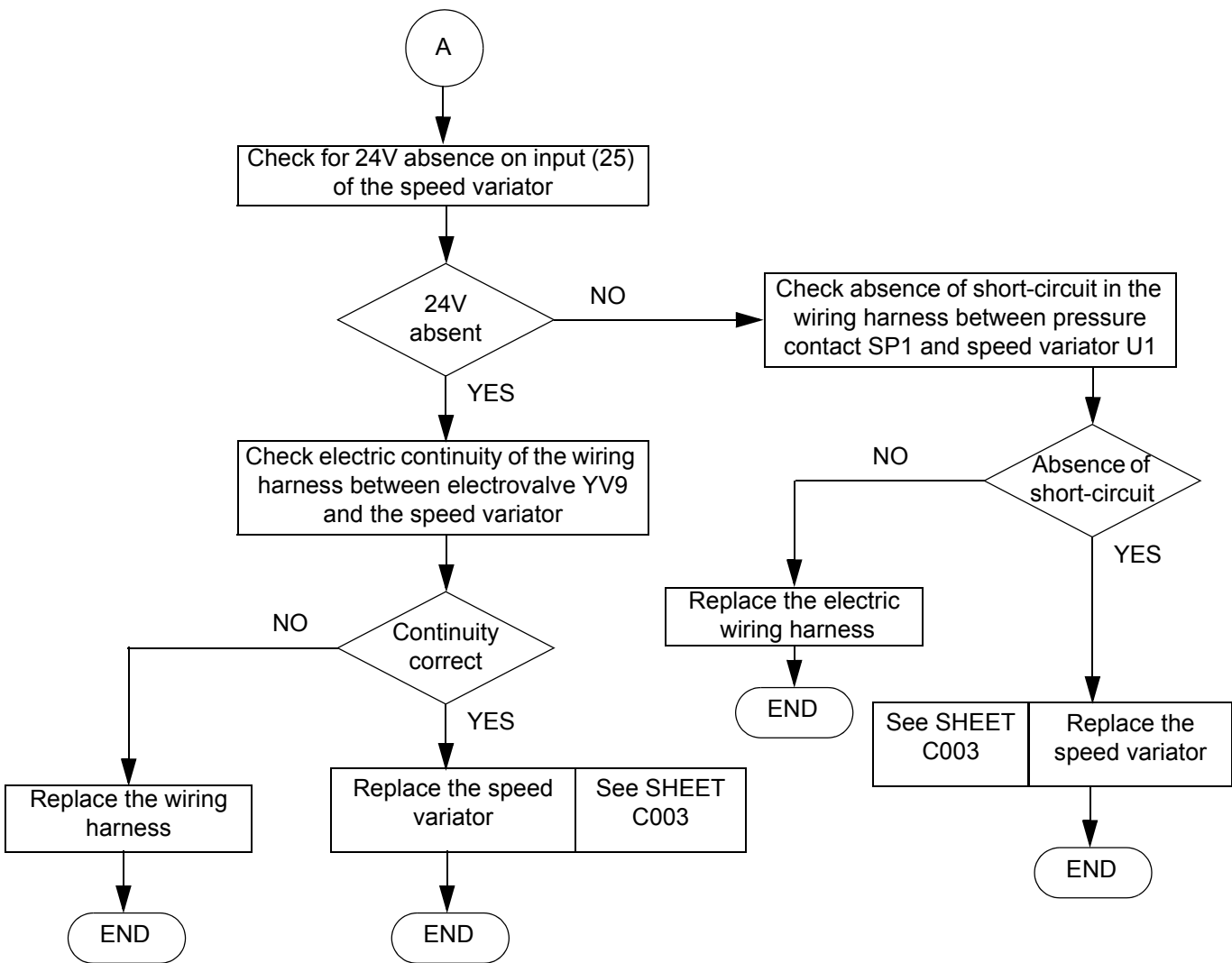
SHEET DP004	FAILURE DETECTION FLOW CHART	Sheet 2/2
	NO DOWN MOVEMENT FROM THE PLATFORM OR CHASSIS CONTROL	



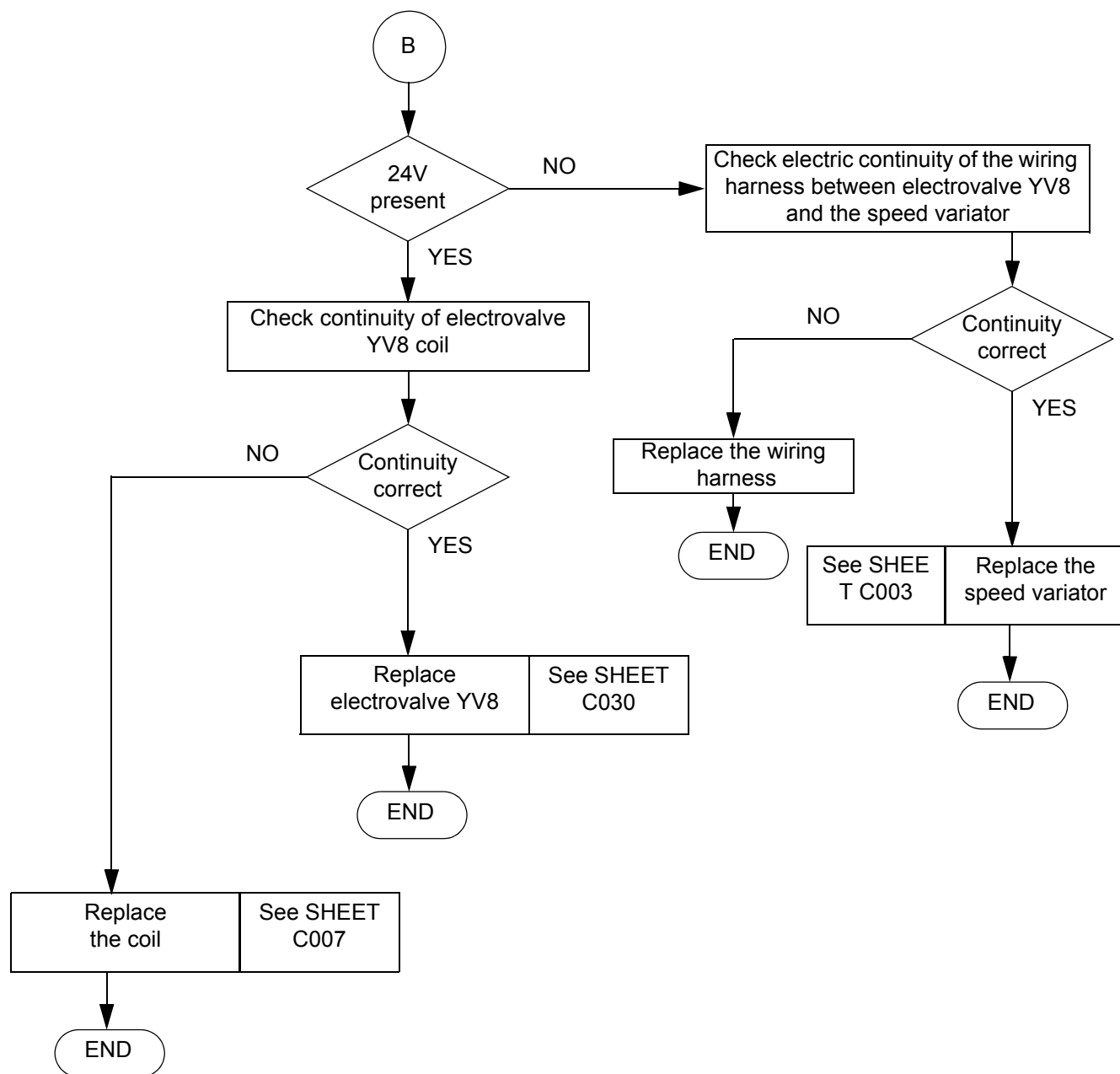
SHEET DP005	FAILURE DETECTION FLOW CHART	Sheet 1/4
	PLATFORM (ABOVE 1.5M OR 4FT92IN) DESCENT IS SLOW FROM THE PLATFORM OR CHASSIS CONTROL	



SHEET DP005	FAILURE DETECTION FLOW CHART	Sheet 2/4
	PLATFORM (ABOVE 1.5M OR 4FT92IN) DESCENT IS SLOW FROM THE PLATFORM OR CHASSIS CONTROL	

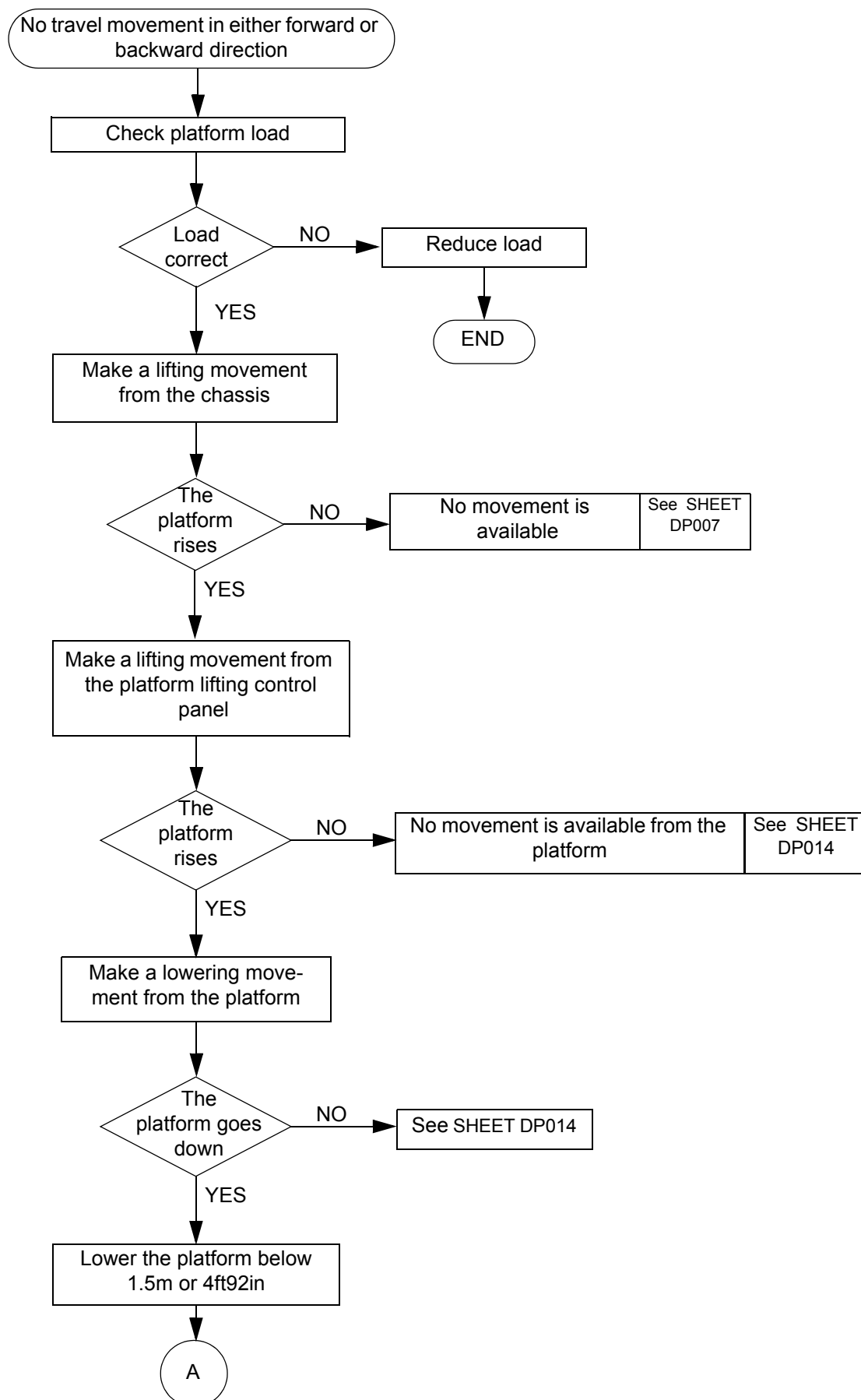


SHEET DP005	FAILURE DETECTION FLOW CHART	Sheet 3/4
	PLATFORM (ABOVE 1.5M OR 4FT92IN) DESCENT IS SLOW FROM THE PLATFORM OR CHASSIS CONTROL	

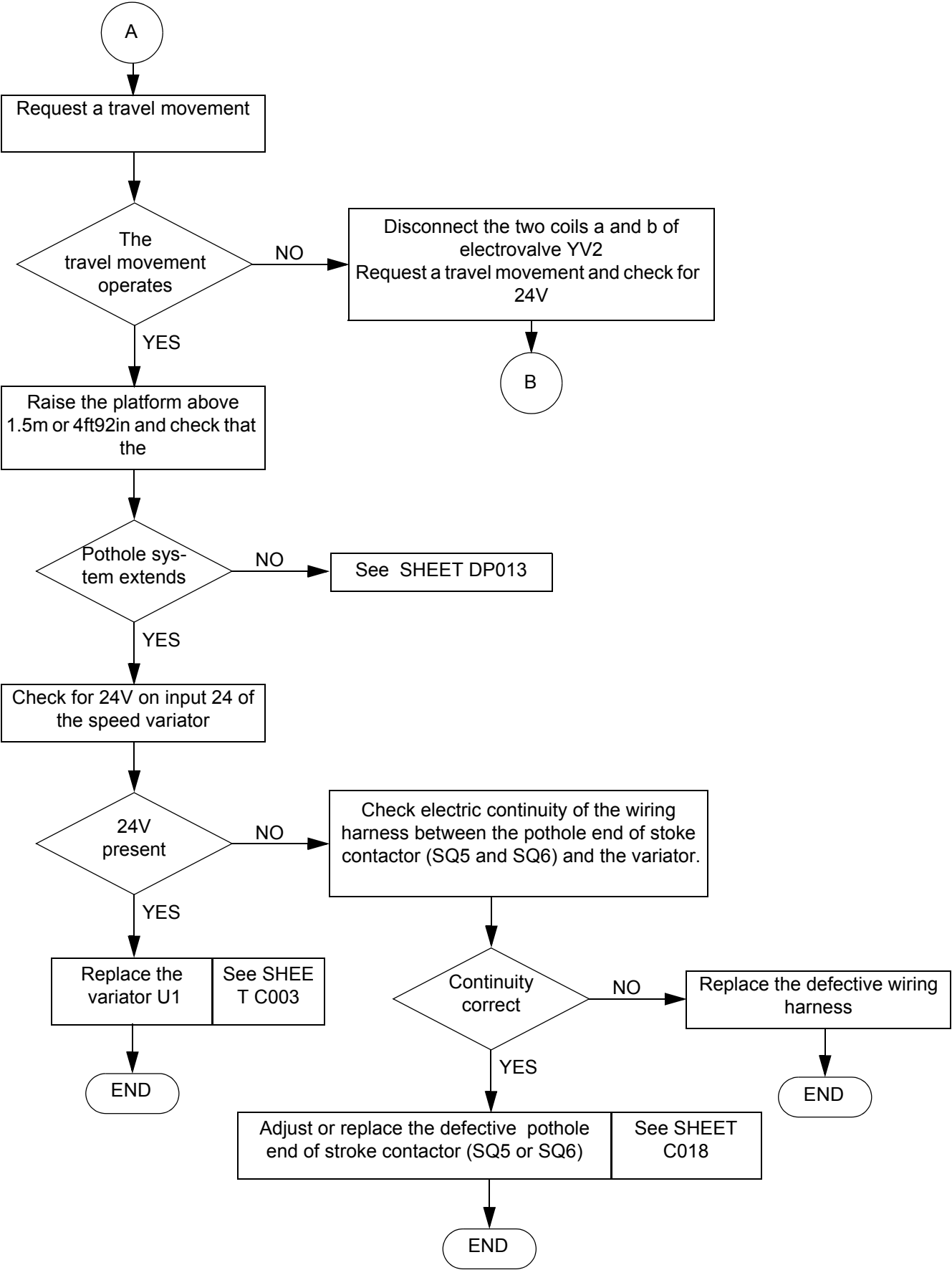


SHEET DP005	FAILURE DETECTION FLOW CHART	Sheet 4/4
	PLATFORM (ABOVE 1.5M OR 4FT92IN) DESCENT IS SLOW FROM THE PLATFORM OR CHASSIS CONTROL	

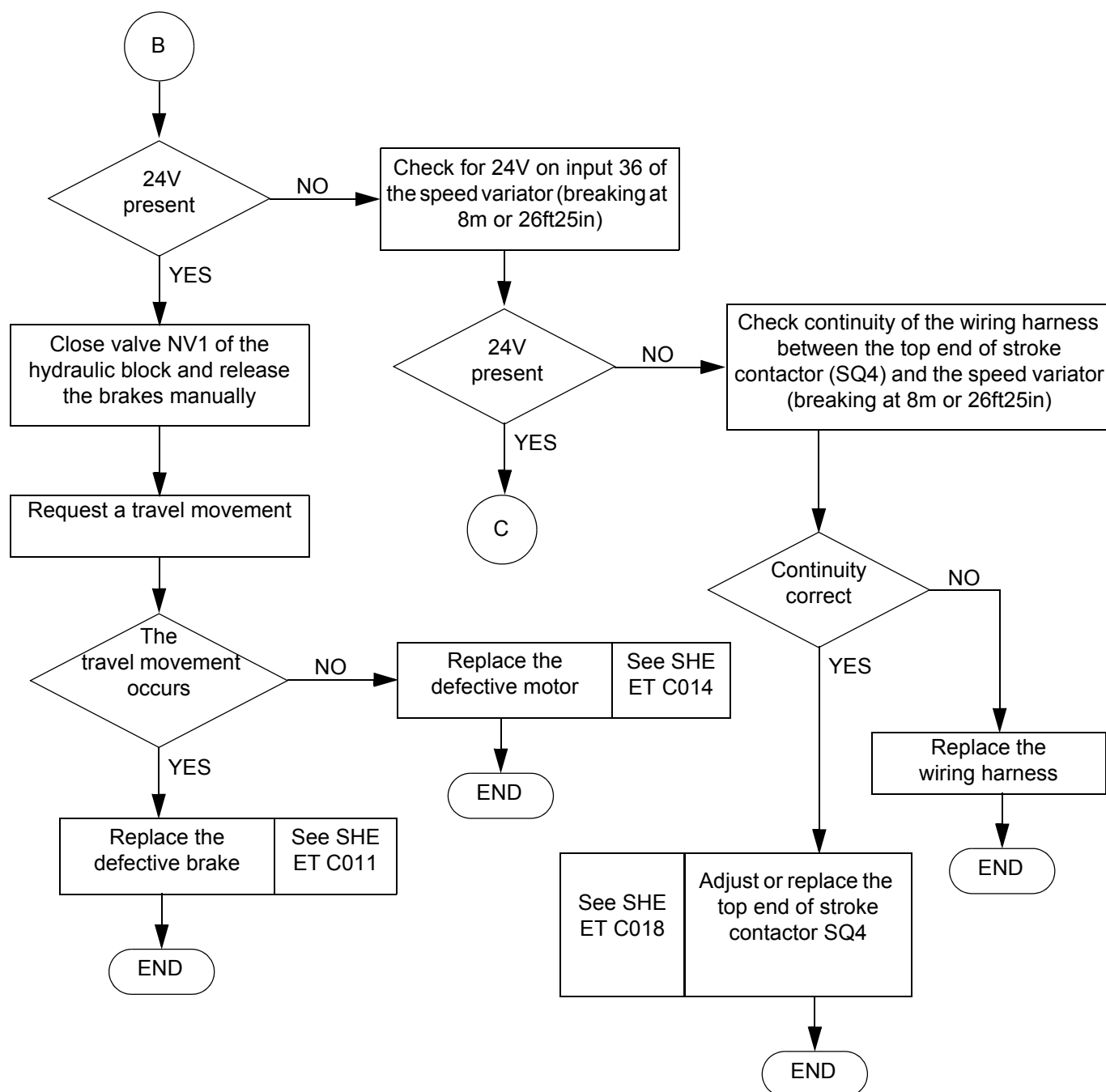
SHEET DP006	FAILURE DETECTION FLOW CHART	Sheet 1/4
	NO TRAVEL MOVEMENT IN BOTH DIRECTIONS FORWARD AND BACKWARD	



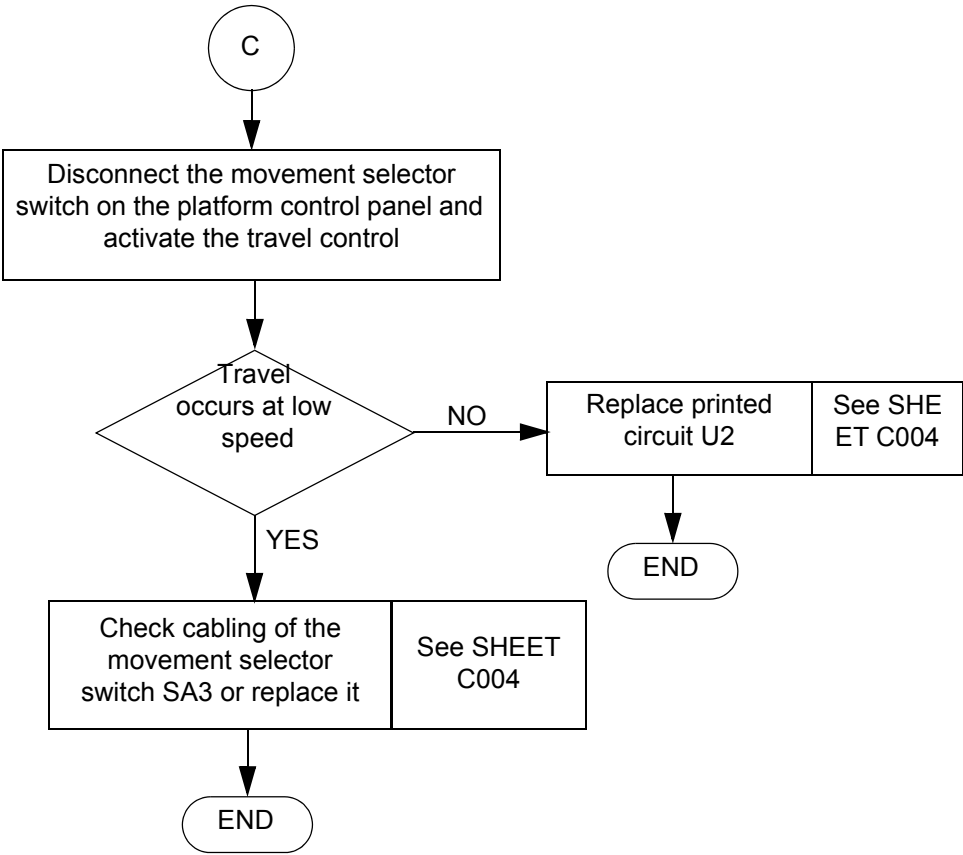
SHEET DP006	FAILURE DETECTION FLOW CHART	Sheet 2/4
	NO TRAVEL MOVEMENT IN BOTH DIRECTIONS FORWARD AND BACKWARD	



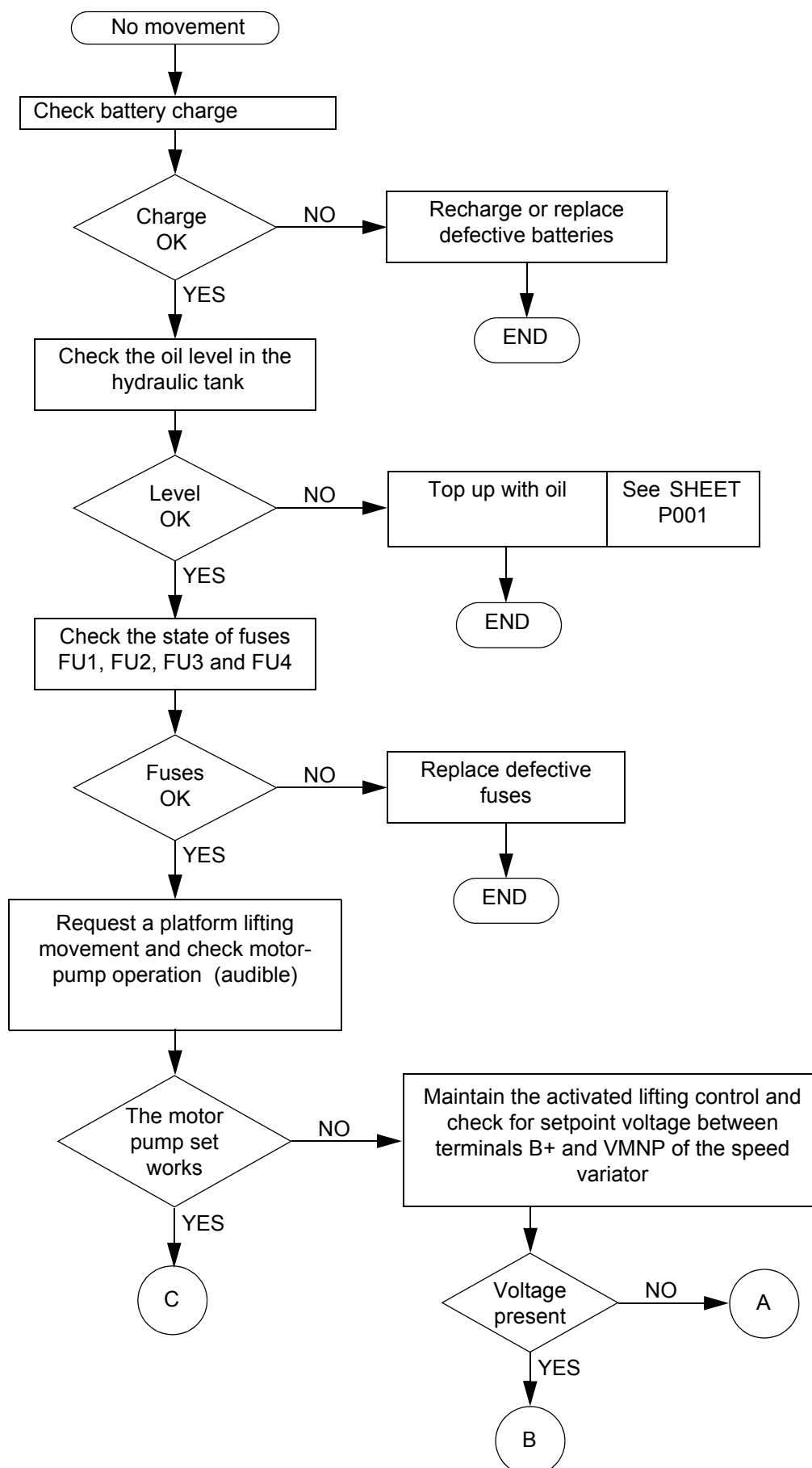
SHEET DP006	FAILURE DETECTION FLOW CHART	Sheet 3/4
	NO TRAVEL MOVEMENT IN BOTH DIRECTIONS FORWARD AND BACKWARD	



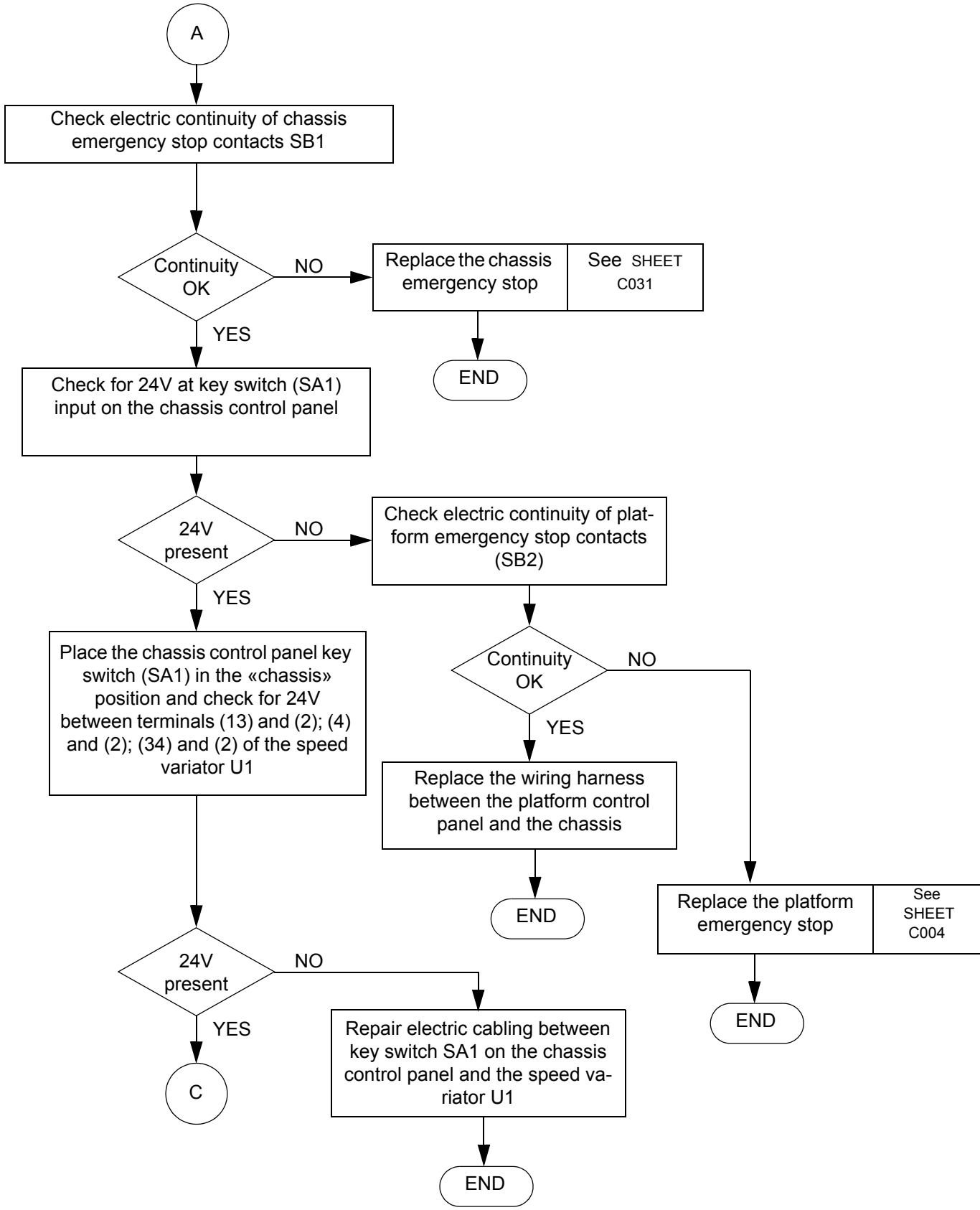
SHEET DP006	FAILURE DETECTION FLOW CHART	Sheet 4/4
	NO TRAVEL MOVEMENT IN BOTH DIRECTIONS FORWARD AND BACKWARD	



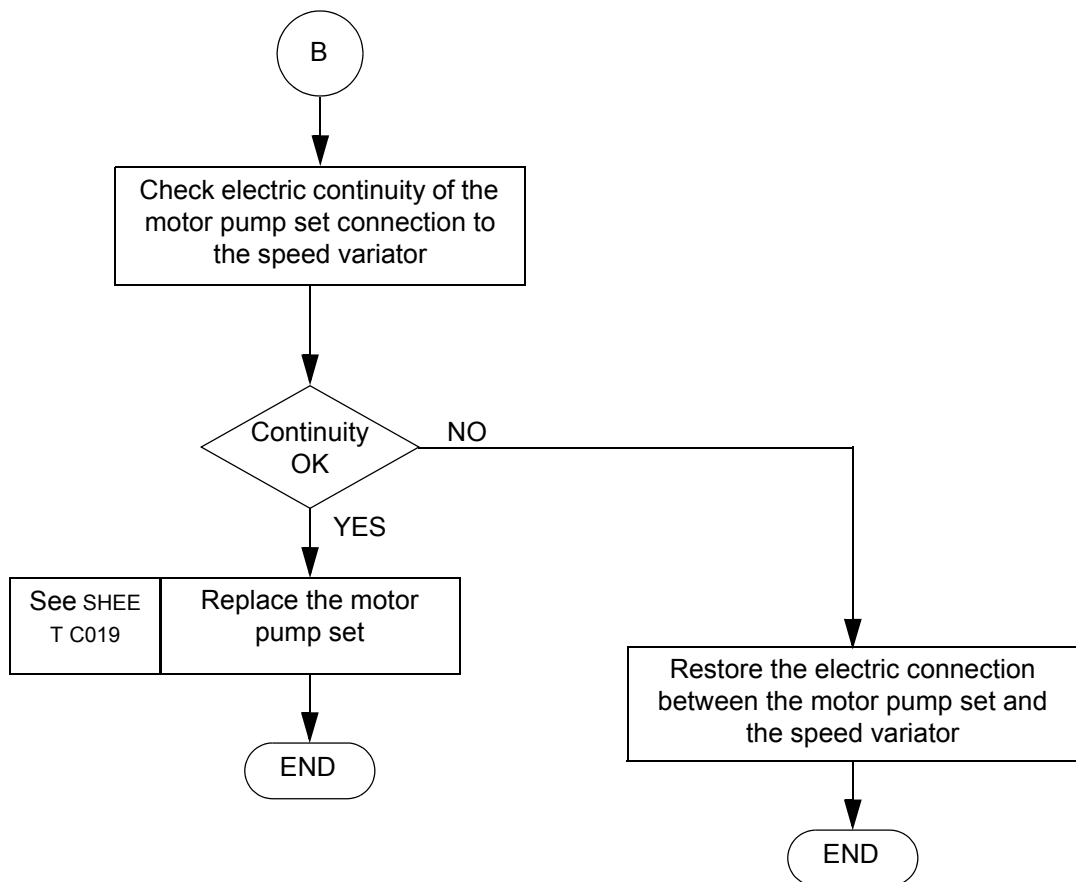
SHEET DP007	FAILURE DETECTION FLOW CHART	Sheet 1/4
	NO MOVEMENT	



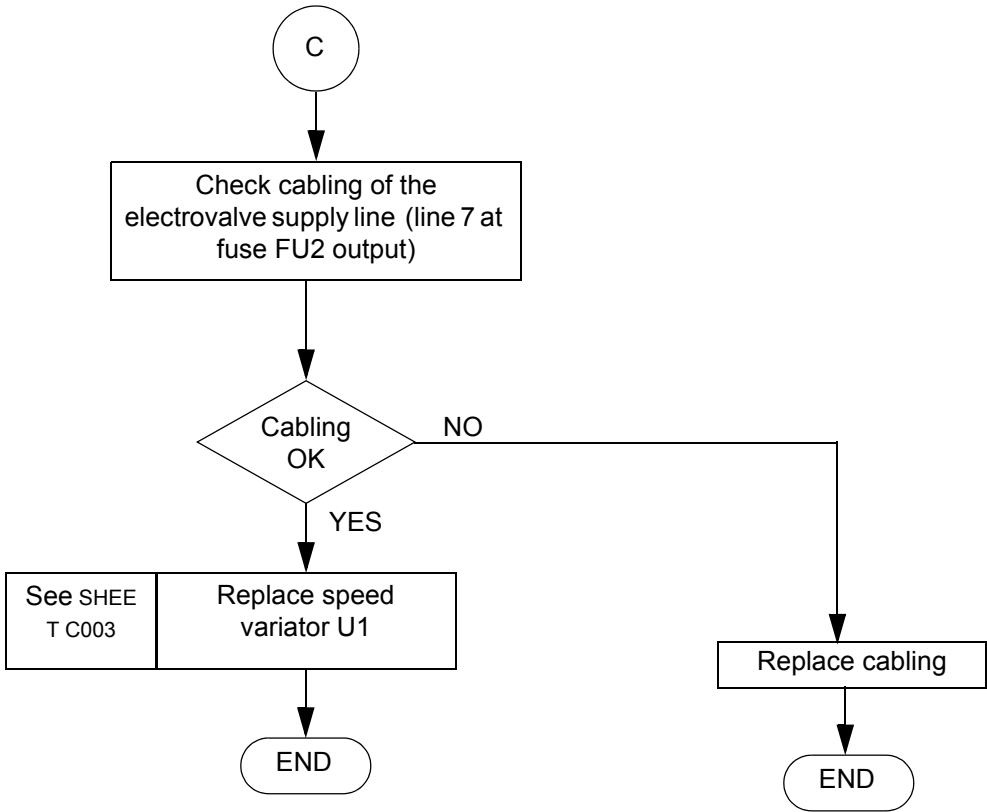
SHEET DP007	FAILURE DETECTION FLOW CHART	Sheet 2/4
	NO MOVEMENT	



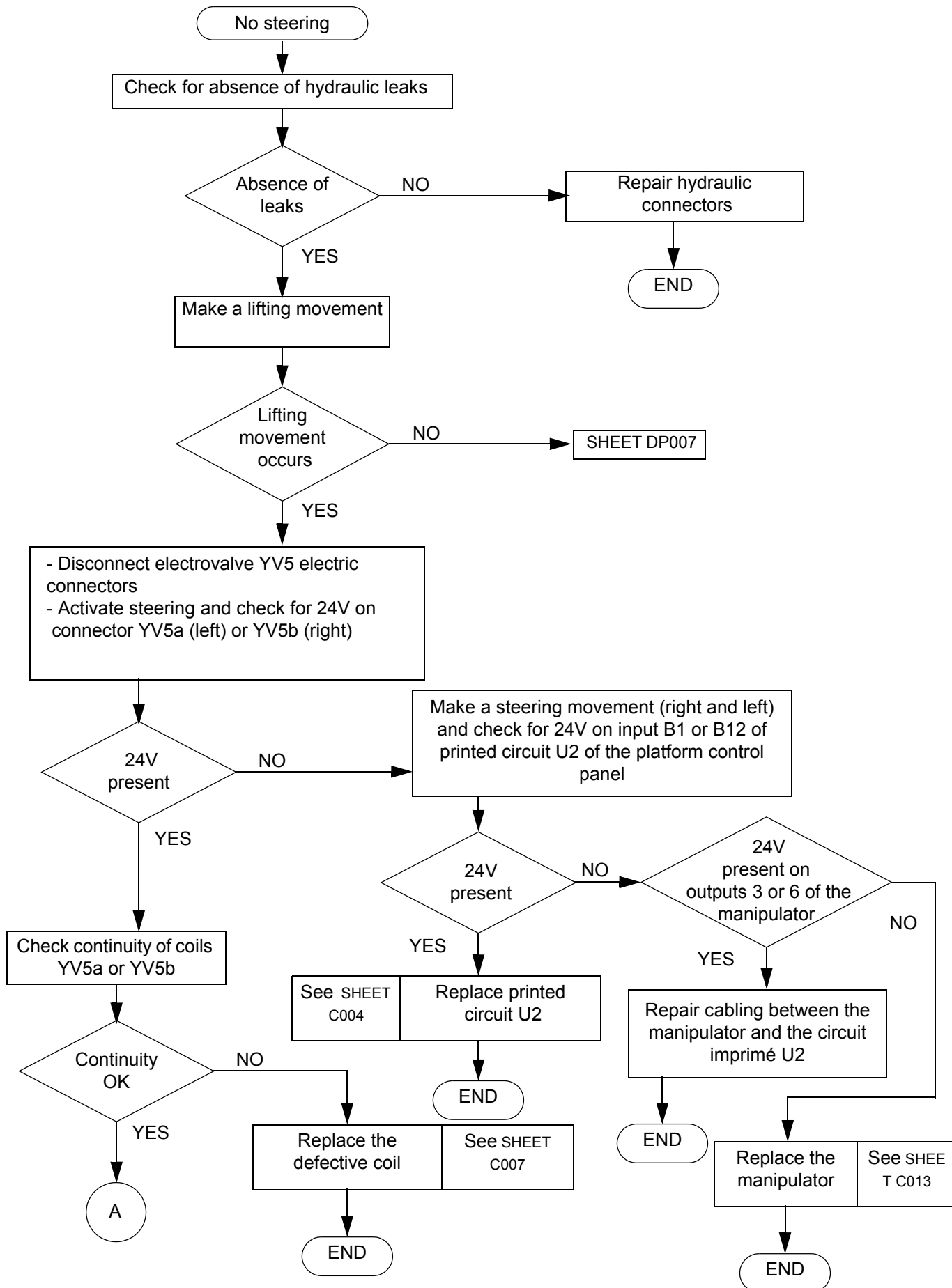
SHEET DP007	FAILURE DETECTION FLOW CHART	Sheet 3/4
	NO MOVEMENT	



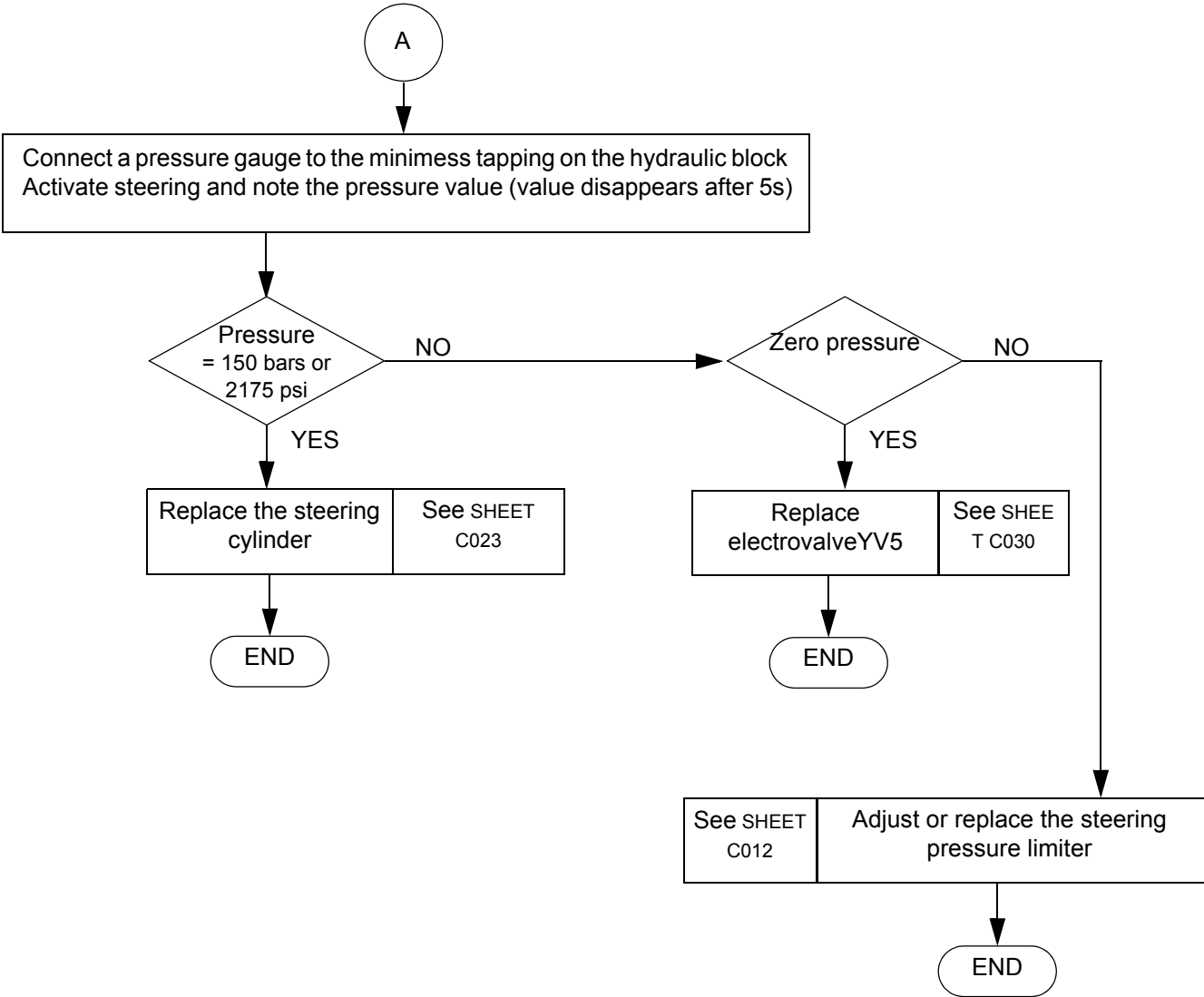
SHEET DP007	FAILURE DETECTION FLOW CHART	Sheet 4/4
	NO MOVEMENT	



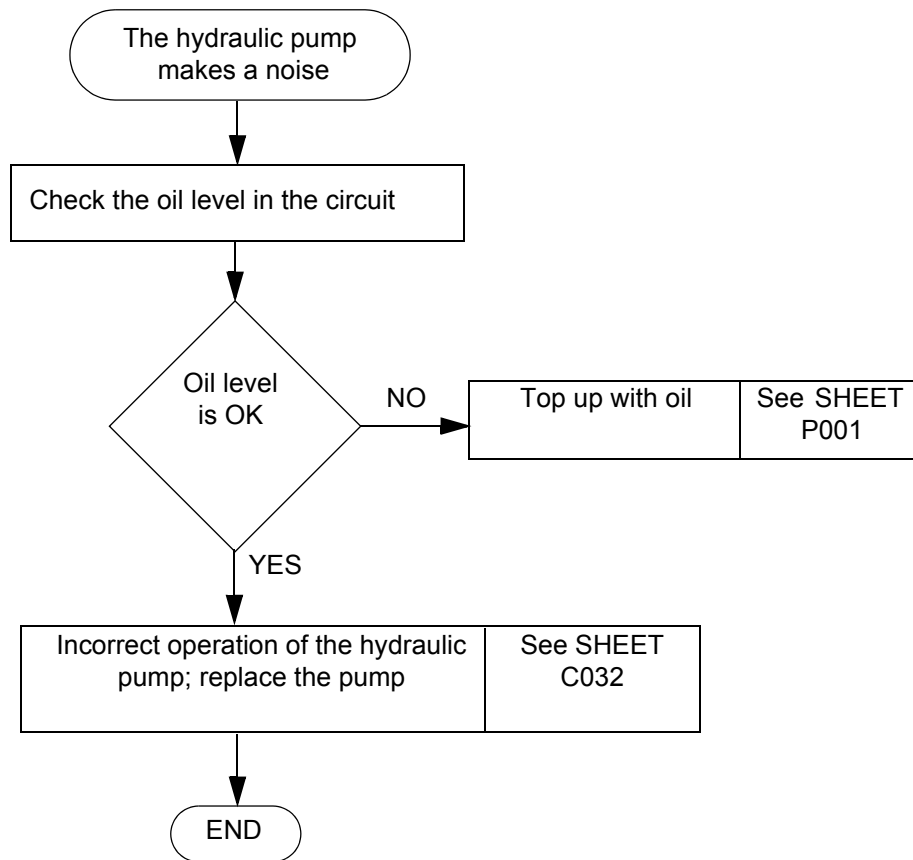
SHEET DP008	FAILURE DETECTION FLOW CHART	Sheet 1/2
	NO STEERING	



SHEET DP008	FAILURE DETECTION FLOW CHART	Sheet 2/2
	NO STEERING	

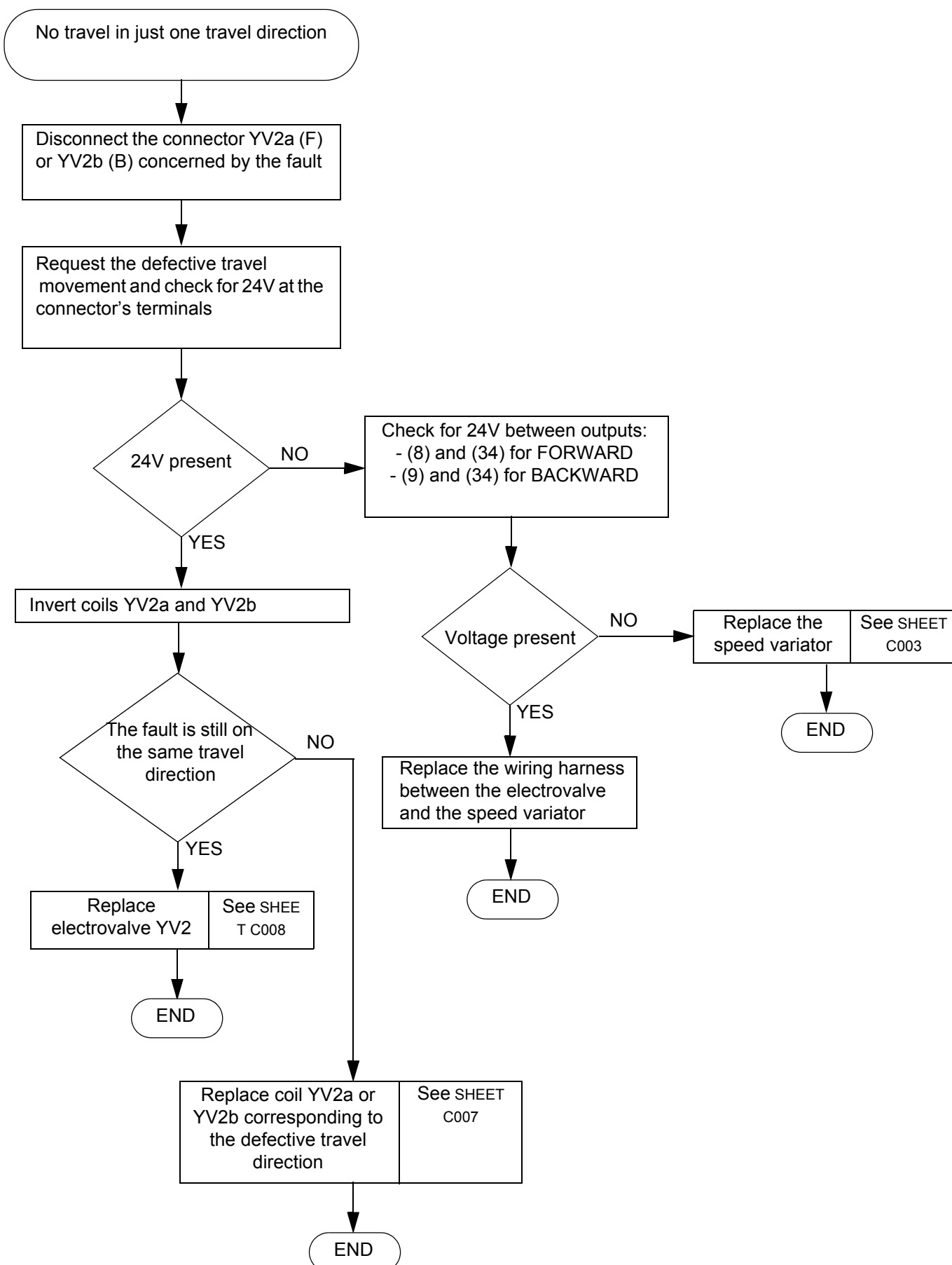


SHEET DP009	FAILURE DETECTION FLOW CHART	Sheet 1/2
	NOISY HYDRAULIC PUMP	



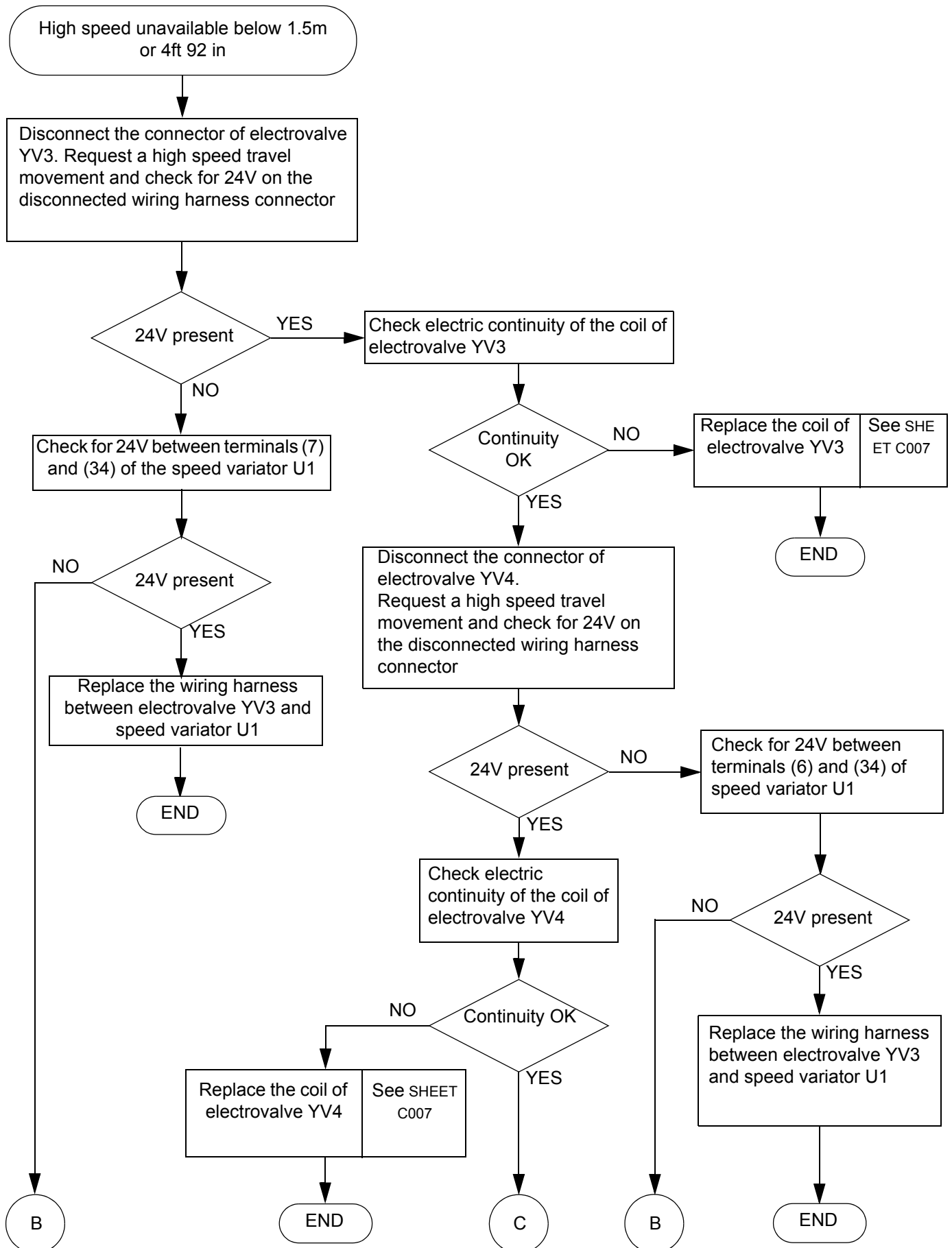
SHEET DP009	FAILURE DETECTION FLOW CHART	Sheet 2/2
	NOISY HYDRAULIC PUMP	

SHEET DP010	FAILURE DETECTION FLOW CHART	Sheet 1/2
	NO TRAVEL IN JUST ONE DIRECTION	

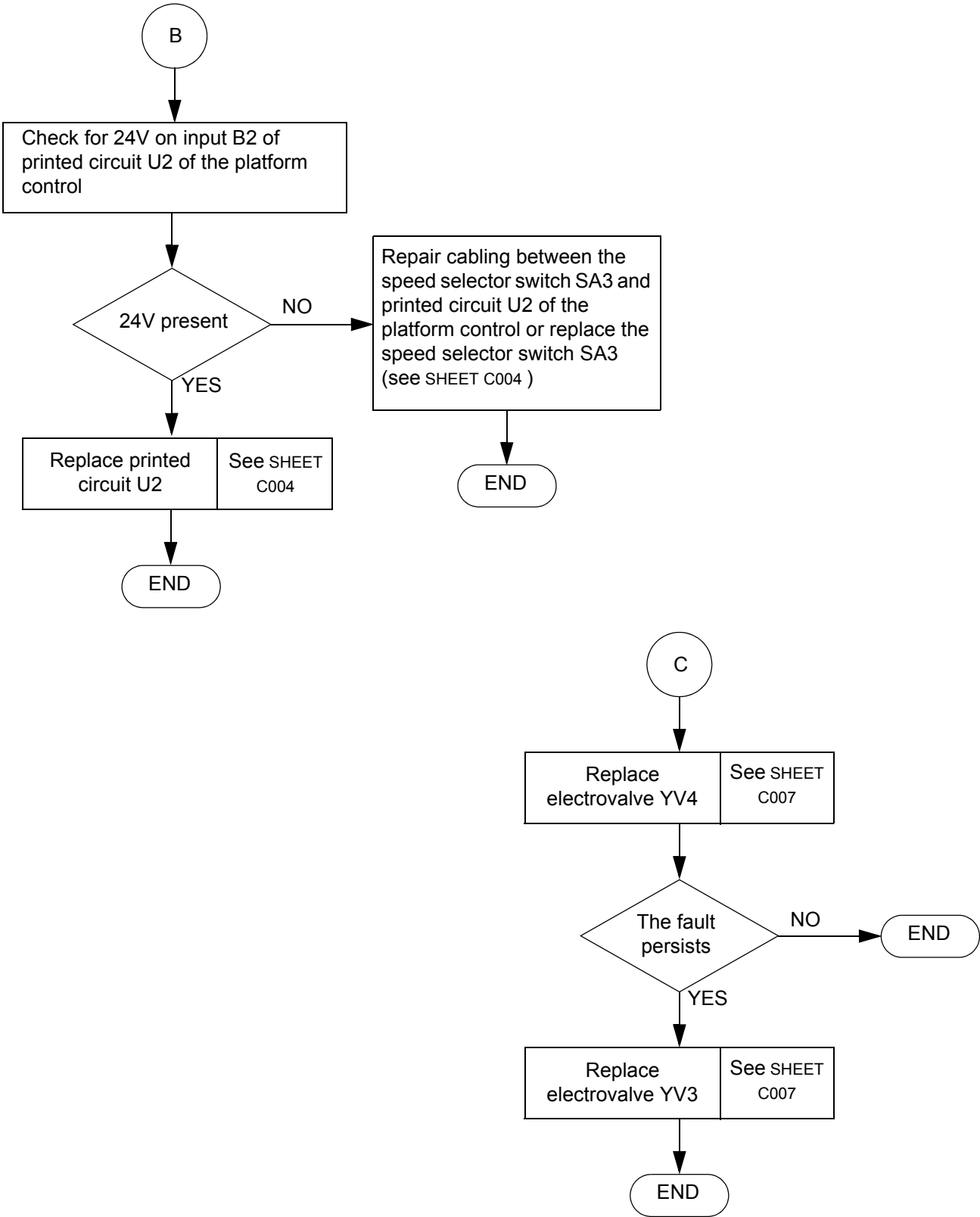


SHEET DP010	FAILURE DETECTION FLOW CHART	Sheet 2/2
	NO TRAVEL IN JUST ONE DIRECTION FORWARD or BACKWARD	

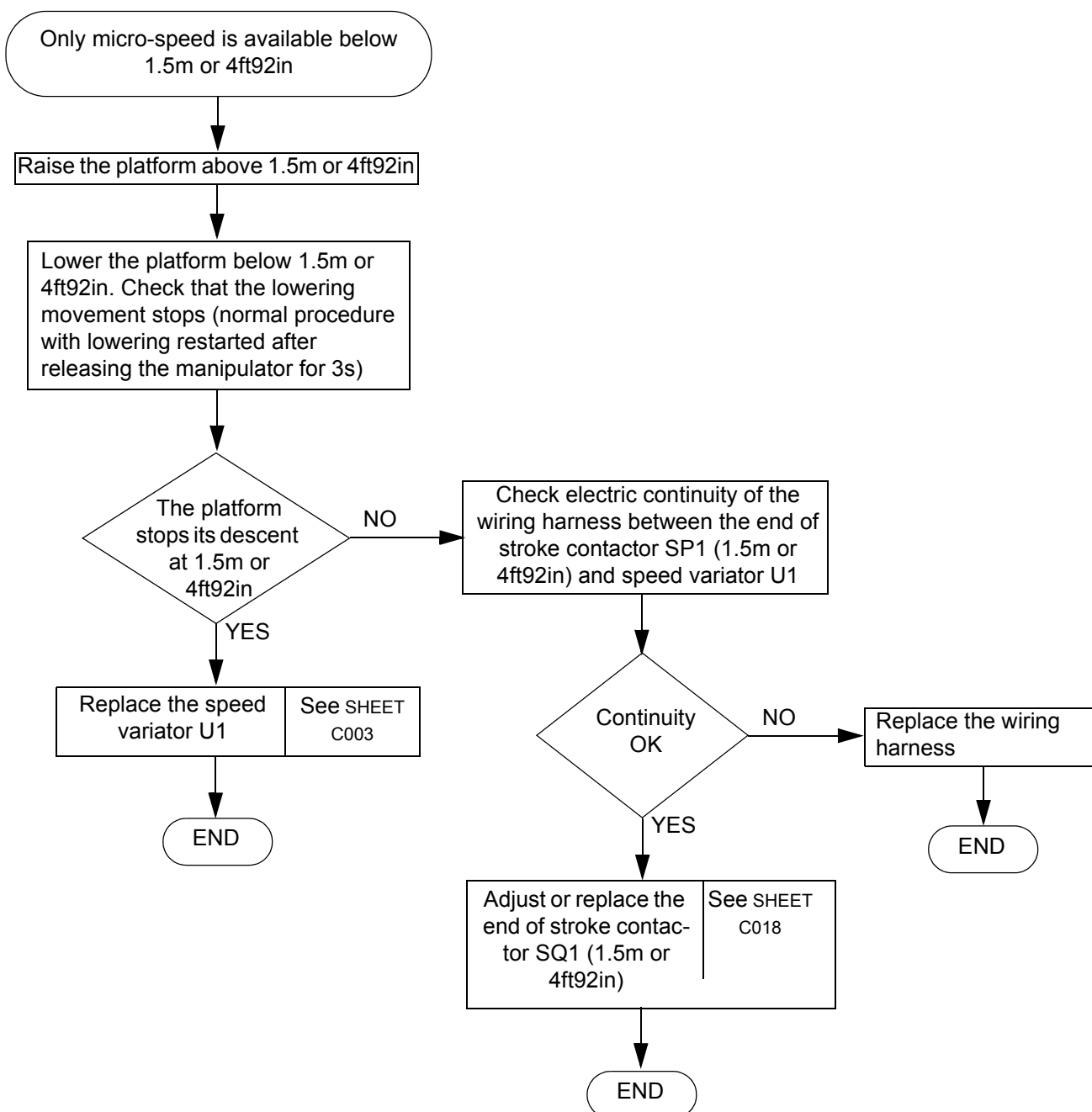
SHEET DP011	FAILURE DETECTION FLOW CHART	Sheet 1/2
	HIGH SPEED UNAVAILABLE BELOW 1.5M OR 4FT92IN	



SHEET DP011	FAILURE DETECTION FLOW CHART	Sheet 2/2
	HIGH SPEED UNAVAILABLE BELOW 1.5M OR 4FT92IN	

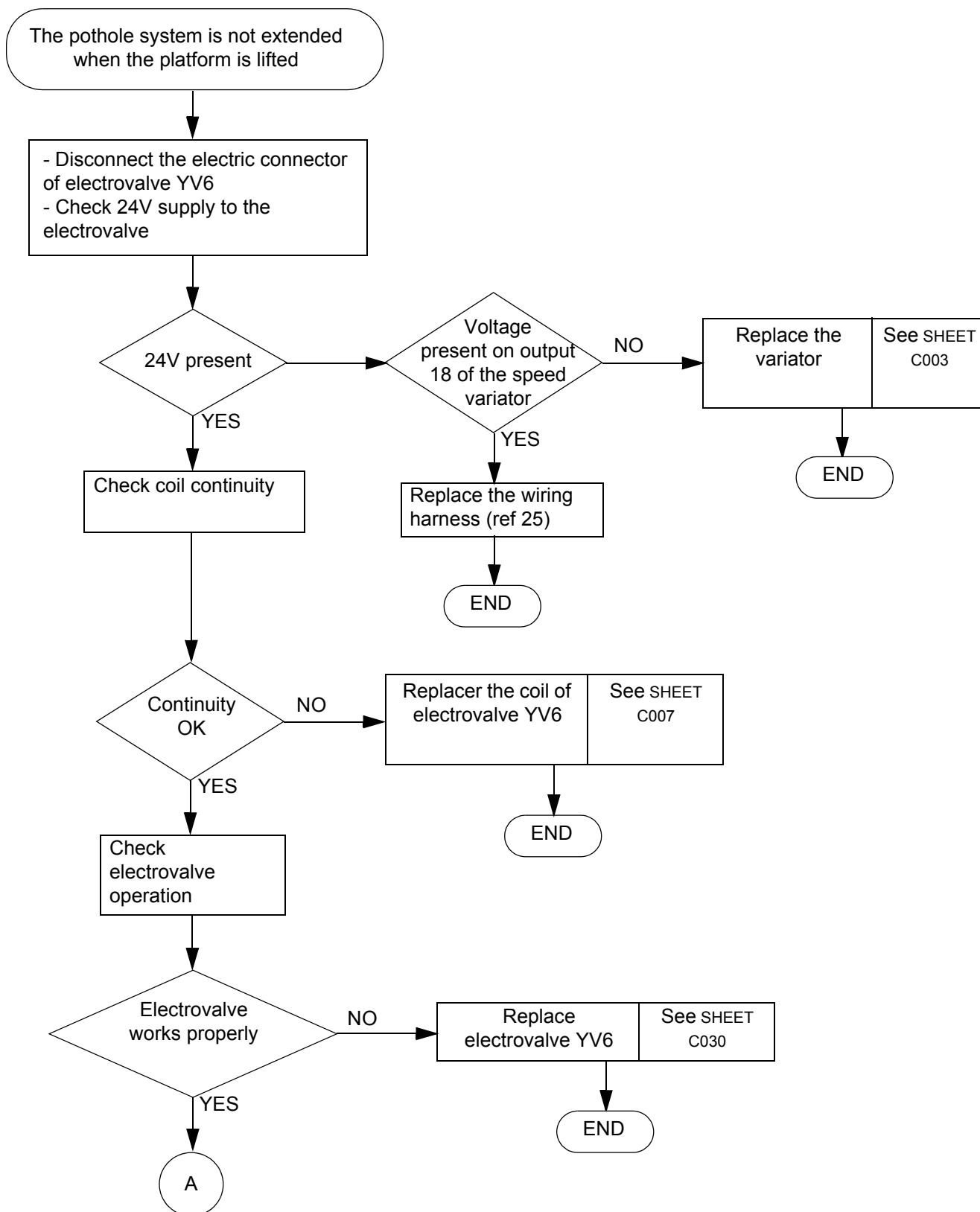


SHEET DP012	FAILURE DETECTION FLOW CHART	Sheet 1/2
	ONLY MICRO-SPEED IS AVAILABLE BELOW 1.5M OR 4FT92IN	

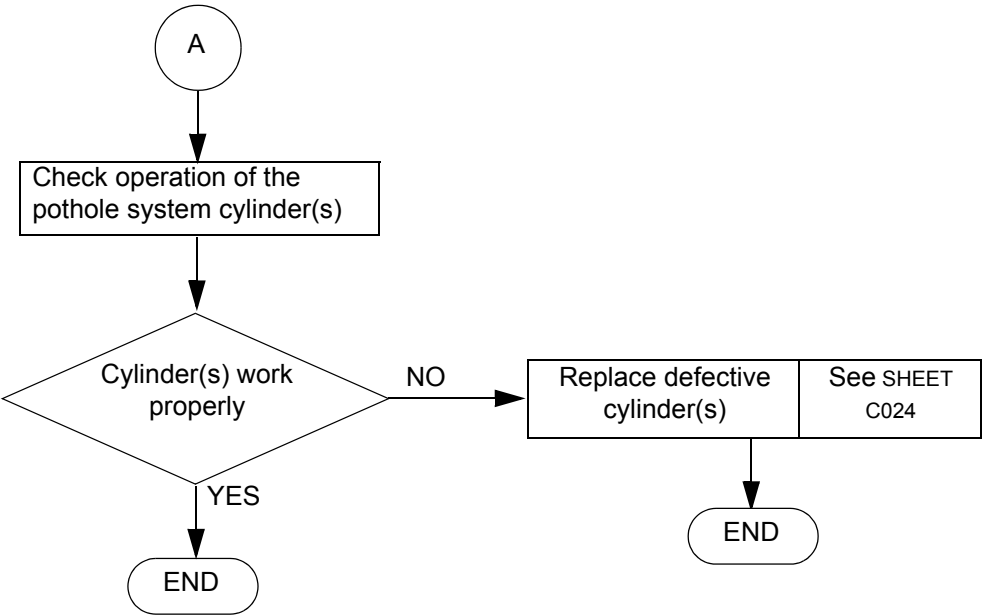


SHEET DP012	FAILURE DETECTION FLOW CHART	Sheet 2/2
	ONLY MICRO-SPEED IS AVAILABLE BELOW 1.5M OR 4FT92IN	

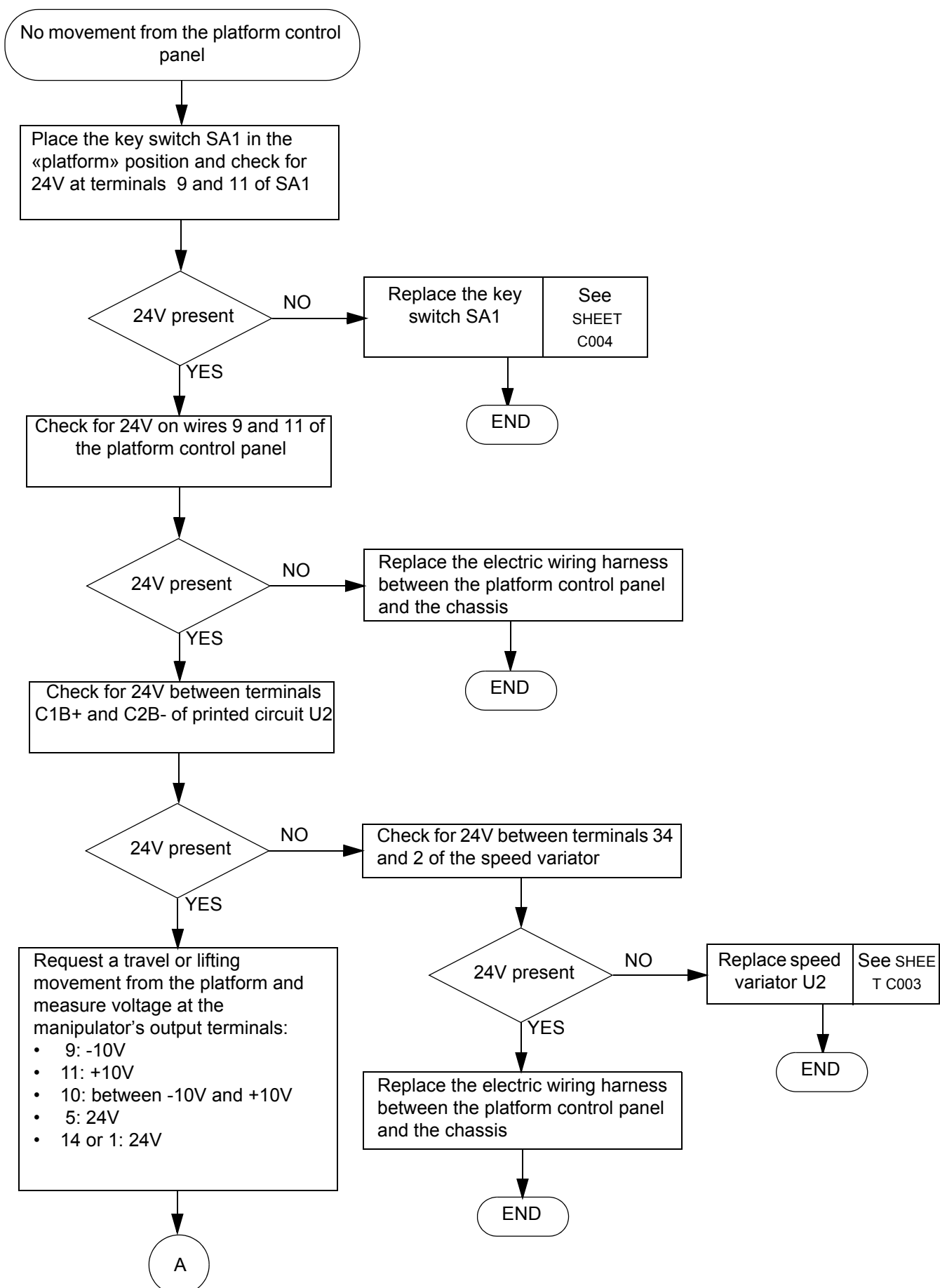
SHEET DP013	FAILURE DETECTION FLOW CHART	Sheet 1/2
	THE POTHOLE SYSTEM IS NOT EXTENDED WHEN THE PLATFORM IS LIFTED	



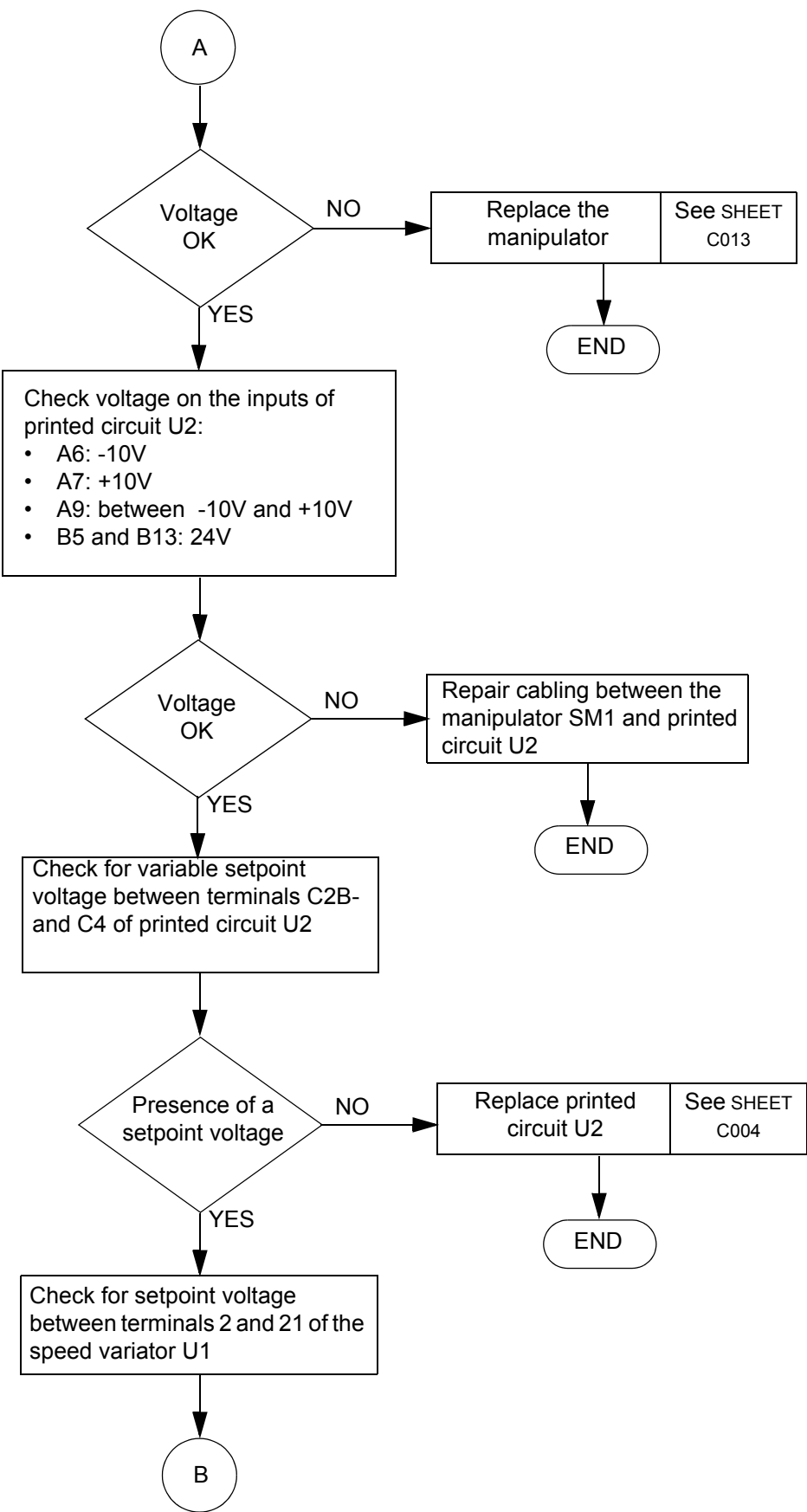
SHEET DP013	FAILURE DETECTION FLOW CHART	Sheet 2/2
	THE POTHOLE SYSTEM IS NOT EXTENDED WHEN THE PLATFORM IS LIFTED	



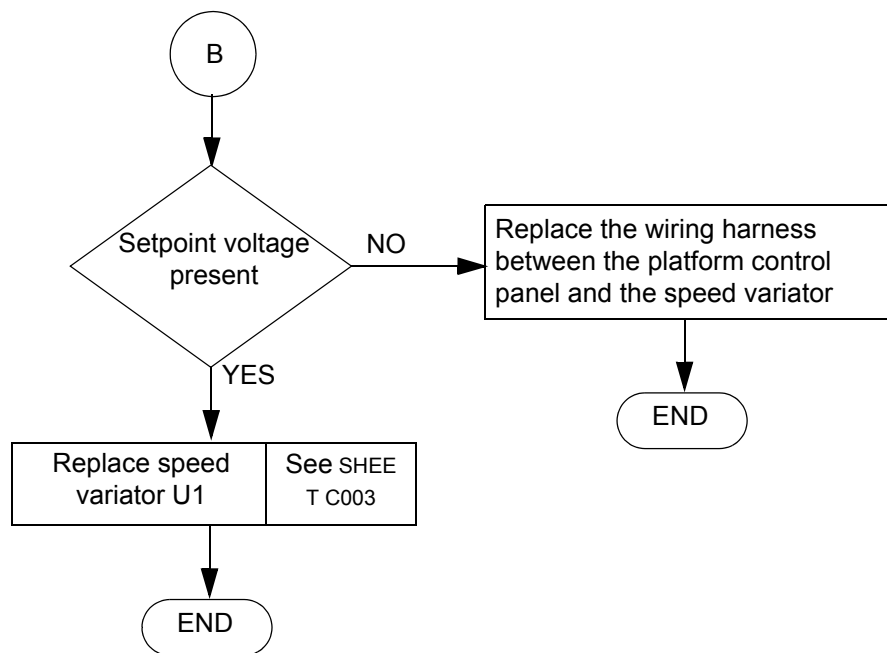
SHEET DP014	FAILURE DETECTION FLOW CHART	Sheet 1/4
	NO MOVEMENT FROM THE PLATFORM CONTROL PANEL	



SHEET DP014	FAILURE DETECTION FLOW CHART	Sheet 2/4
	NO MOVEMENT FROM THE PLATFORM CONTROL PANEL	



SHEET DP014	FAILURE DETECTION FLOW CHART	Sheet 3/4
	NO MOVEMENT FROM THE PLATFORM CONTROL PANEL	



SHEET DP014	FAILURE DETECTION FLOW CHART	Sheet 4/4
	NO MOVEMENT FROM THE PLATFORM CONTROL PANEL	

9 - CORRECTIVE MAINTENANCE PROCEDURES

List of corrective maintenance sheets:

<i>Sheet no.</i>	<i>Description</i>
FICHE C001	Replacing a lifting cylinder
FICHE C002	Adjusting a hydraulic block pressure limiter
FICHE C003	Replacing a variable speed drive
FICHE C004	Replacing a component on the platform control station
FICHE C005	Replacing a component on the chassis control station
FICHE C006	Replacing the tilt detector
FICHE C007	Replacing a coil
FICHE C008	Replacing the travel eletrovalve
FICHE C009	Replacing the hydraulic filter
FICHE C010	Replacing a hose
FICHE C011	Replacing a vacuum brake
FICHE C012	Replacing a hydraulic block pressure limiter
FICHE C013	Replacing a manipulator
FICHE C014	Replacing a hydraulic travel motor
FICHE C015	Replacing the buzzer
FICHE C016	Replacing the distribution block
FICHE C017	Replacing the remote control system
FICHE C018	Replacing the end of stroke sensor
FICHE C019	Replacing the motor pump set
FICHE C020	Replacing a hydraulic block valve
FICHE C021	Replacing a wheel
FICHE C022	Replacing the brake release pull
FICHE C023	Replacing the steering cylinder
FICHE C024	Replacing a pothole cylinder
FICHE C025	Replacing the platform extension
FICHE C026	Replacing the platform
FICHE C027	Replacing the scissors (and pads)
FICHE C028	Replacing a scissor ring or axle
FICHE C029	Replacing the balancing valves
FICHE C030	Replacing a cartridge electrovalve
FICHE C031	Replacing the chassis emergency stop button
FICHE C032	Replacing the hydraulic pump
FICHE C033	Replacing and adjusting the pressure switch

SHEET C001	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING A LIFTING CYLINDER	

Caution!

Ensure that oil temperature is not too high.

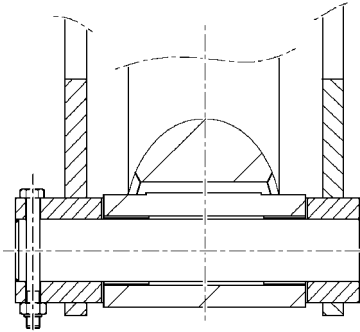
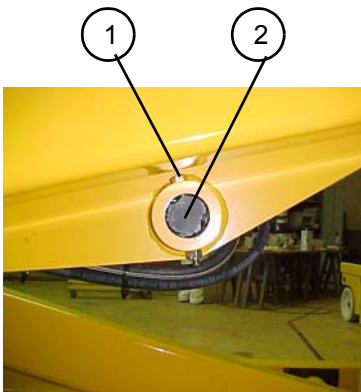


Fig. 1

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing the cylinder

- Remove the cylinder remote control, if any (see SHEET C017).
- Mark and disconnect the cylinder pressure switch's electric connections.
- Mark and disconnect the cylinder's hydraulic hoses.
- Fit caps to the hoses.
- Put the cylinder into slings.
- Remove the two cylinder axle stop bolts (1), on the rod and body side.
- Remove the two axles (2) (also see figure 1) and remove the cylinder.

3 - Replacing the cylinder

- Put the new cylinder into place using slings.
- Put back the cylinder axle on the cylinder body side and secure using the axle stop bolt.

NB: Fit so that the screw is above the axle and the nut underneath (see figure 2).

- Reconnect the cylinder's hydraulic hoses according to the marks made when dismantling.
- Reconnect the pressure switches electric connections, according to the marks made when dismantling.
- Reconnect the cylinder's remote control, if any (see SHEET C017).
- Put the machine back into the operational configuration.
- Perform several lifting cycles to purge the hydraulic circuit.
- Check the oil level in the hydraulic oil tank.

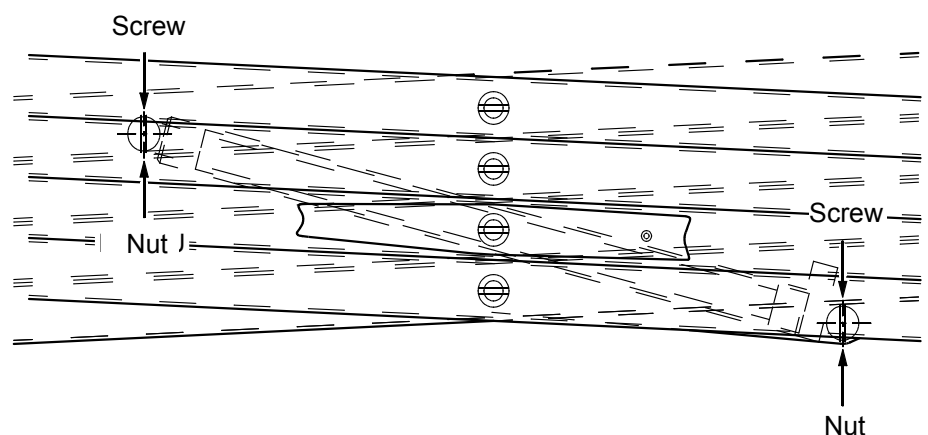
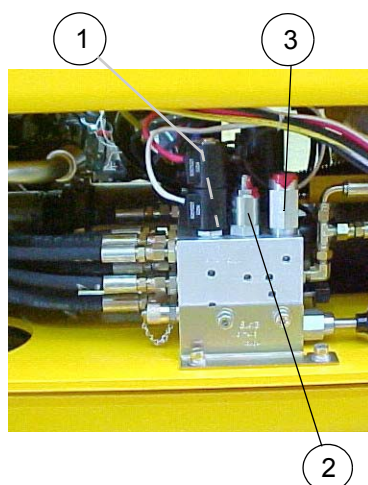


Fig. 2

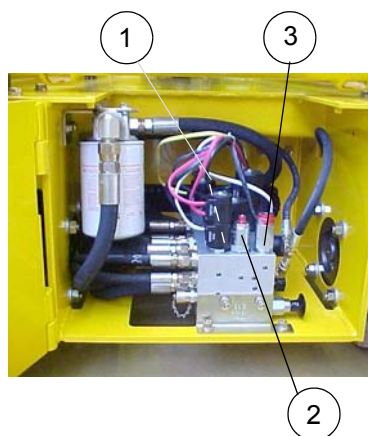
	CORRECTIVE MAINTENANCE SHEET	

SHEET C002	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	ADJUSTING A HYDRAULIC BLOCK PRESSURE LIMITER	

Caution!
Ensure that oil temperature
is not too high.



Compact



Optimum

1 - Adjusting the general pressure limiter (1)

- Put the machine in the low position.
- Cut off the electric power supply (see § 6.3, page 26).
- Unscrew the cap of the hydraulic pressure tap marked «MX» on the hydraulic block and connect a pressure gauge with sufficient range to measure overall pressure.
- Restore the electric power supply (see § 6.3, page 26).
- Bring the machine against a wall to block the travel movement.
- Request a travel movement and measure overall pressure on the pressure gauge.
- Adjust the hexagonal hollow head screw on the overall pressure limiter (1) so that movements are disabled at the pressure indicated in the table below.
- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).
- Unscrew the pressure gauge and put the cap back on the hydraulic pressure tap.
- Put the machine back in the operational configuration.
- Make several travel movements to check that the machine works properly.

2 - Adjusting the steering pressure limiter (2)

- Put the machine in the low configuration.
- Cut off the electric power supply (see § 6.3, page 26).
- Unscrew the cap of the hydraulic pressure tap marked «MX» on the hydraulic block and connect a pressure gauge with sufficient range to measure the steering pressure.
- Restore the electric power supply (see § 6.3, page 26).
- Activate the steering command as far as possible to the right or left.
- Maintain the steering command and measure the steering pressure on the pressure gauge.

NB:

Steering is disabled after a certain period when at the maximum in one direction, and only the other direction is possible and can re-authorise steering in the initial direction. The steering pressure measurement time is therefore limited.

- If necessary, adjust the hexagonal hollow head screw on the steering pressure limiter (2) to disable movement at the pressure indicated in the table below.
- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).
- Unscrew the pressure gauge and put the cap back on the hydraulic pressure tap.
- Put the machine back in the operational configuration.
- Make several steering movements to check that the machine works properly.

SHEET C002	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2
	ADJUSTING A HYDRAULIC BLOCK PRESSURE LIMITER	

3 - Adjusting the lifting pressure limiter (3)

- Put the platform in the low configuration.
- Unscrew the lifting pressure limiter adjusting screw (3).
- Place a load corresponding to nominal load + 10% in the platform (see table below).
- Lift the platform and tighten the pressure limiter adjustment screw until movements are disabled for this load.
- Place a load corresponding to nominal load in the platform (see table below).
- Check that the lifting movement is not disabled for this load.
- Put the machine back into the operational configuration.

4 - Load and pressure table

	Nominal load	Nominal load +10%	Overall hydraulic pressure	Steering pressure
H8SN	outdoor use: 120kg indoor use: 350kg	outdoor use: 132kg indoor use: 385kg	200 bars	150 bars
H8SW	outdoor use: 120kg indoor use: 450kg	outdoor use: 132kg indoor use: 495kg	200 bars	150 bars
H10S	outdoor use: 120kg indoor use: 450kg	outdoor use: 132kg indoor use: 495kg	220 bars	150 bars
H12SN	outdoor use: 120kg indoor use: 300kg	outdoor use: 132kg indoor use: 330kg	240 bars	150 bars
Optimum 6	outdoor use: 115kg indoor use: 270kg	outdoor use: 126.5kg indoor use: 297kg	230 bars	100 bars
Optimum 8	indoor use: 230kg	indoor use: 253kg	230 bars	100 bars

(tolerance: + or - 10%)

SHEET C003	CORRECTIVE MAINTENANCE SHEET	Sheet 1/4
	REPLACING THE SPEED VARIATOR	

1 - Preliminary operations

- Put the machine in the low position.
- Cut off the electric power supply (see § 6.3, page 26).
- Disconnect the + and - terminals of the batteries to isolate the electric circuit.

2 - Removing the speed variator

- Disconnect the speed variator's electric connections.
- Remove the speed variator (1).

3 - Replacing the speed variator

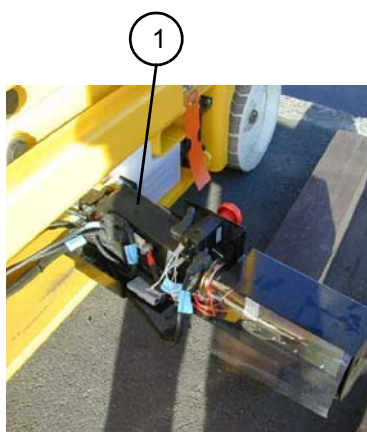
- Put the speed variator back into place and secure with the fixing screws.
- Reconnect the speed variator's electric connections.
- Reconnect the + and - terminals of the batteries.
- Put the machine back in the operational configuration.



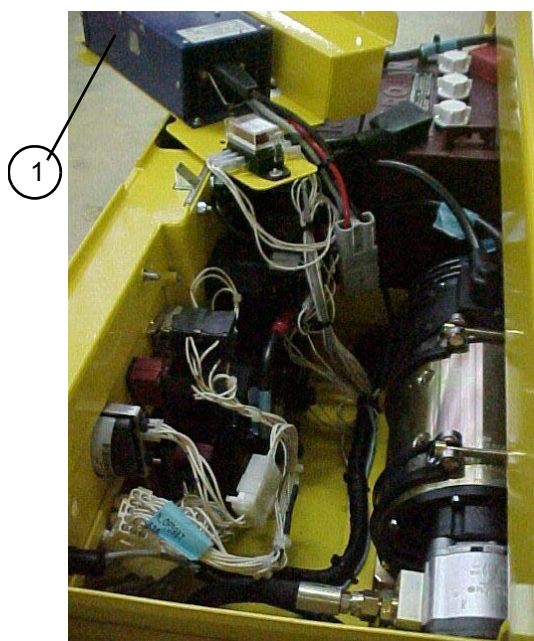
Compact



Optimum

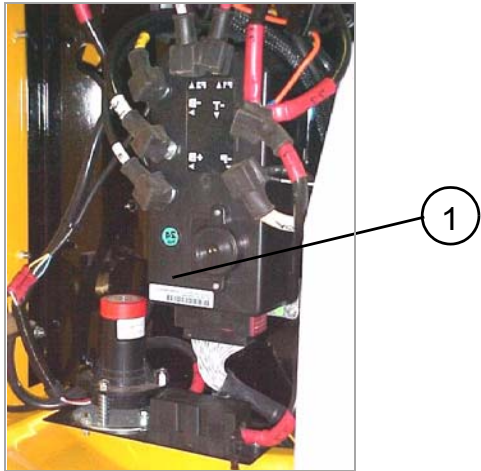


Compact

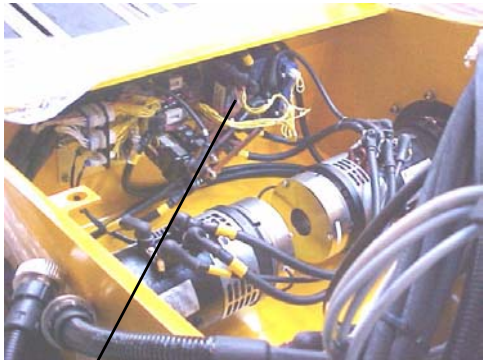
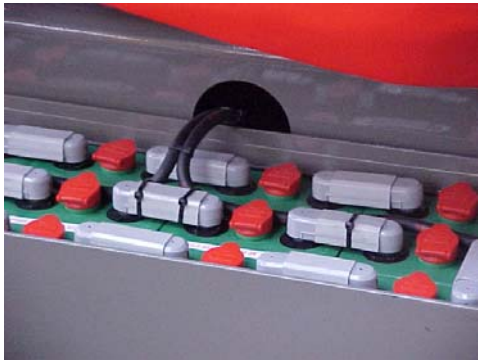


Optimum

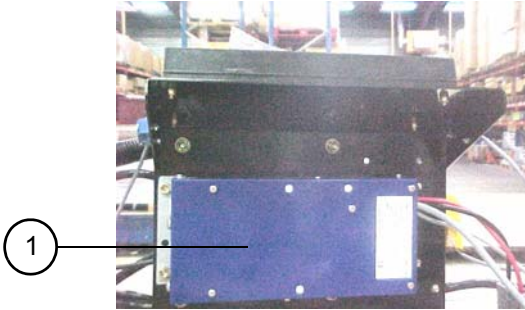
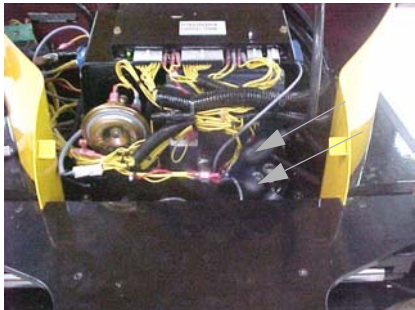
SHEET C003	CORRECTIVE MAINTENANCE SHEET	Sheet 2/4
	REPLACING THE SPEED VARIATOR	



Star 22 J / Star 8



HA12IP / HA33JE



STAR 6 - STAR 13

	CORRECTIVE MAINTENANCE SHEET	Sheet 3/4

	CORRECTIVE MAINTENANCE SHEET	Sheet 4/4

SHEET C004	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING A COMPONENT ON THE PLATFORM CONTROL PANEL	

Caution!
Do not use the machine
during maintenance
operations.

1 - Preliminary operations

- Cut off the electric power supply (see § 6.3, page 28).

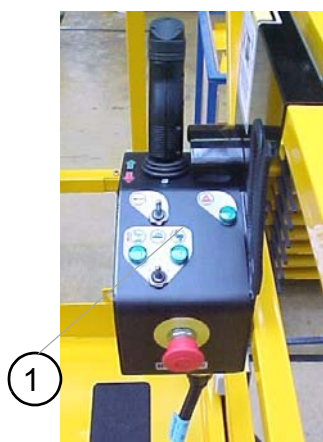
2 - Removing a component from the platform control panel

- Remove the closing plate (1) by unscrewing the four fixing screws.
- Mark and disconnect the electric connections of the component to be replaced.
- Remove the component.

3 - Replacing a component on the platform control panel

- Put a new component and seal into place on the front of the platform control panel.

NB: *If it is a lever switch, adjust the position of the fixing nut and counter nut so that the switch lever joint axle is on the same level as the seal, to ensure tightness.*



Compact - Optimum

- Reconnect the electric connections according to the marks made when dismantling.
- Fix the closing plate with the four fixing screws.
- Perform the function corresponding to the replaced component to check that it works properly.



Star 8 - HM10P (star 10)

	CORRECTIVE MAINTENANCE SHEET	

SHEET C005	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING A COMPONENT ON THE CHASSIS CONTROL PANEL	

Caution!
Do not use the machine during maintenance operations.

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing a component from the chassis control panel (1)

- Remove the protective plate (2) from the chassis control panel.
- Mark and disconnect the electric connections of the component requiring replacement.
- Remove the component.

3 - Replacing a component in the chassis control panel

- Put the new component and seal on the front of the chassis control panel.

NB: If it is a lever switch, adjust the position of the fixing nut and counter nut so that the switch lever joint axle is on the same level as the seal, to ensure tightness.

- Reconnect the electric connections according to the marks made when dismantling.
- Put back the chassis control panel protective plate.

4 - Test

- Put the machine back into the operational configuration.
- Perform the function corresponding to the replaced component to check that it works properly.



1

Compact



1

Optimum



2

	CORRECTIVE MAINTENANCE SHEET	

SHEET C006	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING THE TILT DETECTOR	

Caution!
Do not use the machine during maintenance operations.



1 - Preliminary operations

- Place the platform on a flat, level floor with no slope.
- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing the tilt detector

- Mark and disconnect the tilt detector's electric connections
- Remove the tilt detector by unscrewing the three fixing bolts.

3 - Replacing the tilt detector

- Put a new tilt detector into place and secure with the three fixing bolts.
- Reconnect the electric connections, according to the marks made when dismantling.
- Place a spirit level on the top of the tilt detector and adjust the fixing screws to align the tilt detector.

NB: A spirit level is built into certain tilt detectors.

- Put the machine back into the operational configuration.

4 - Operating test of the tilt detector

- Lift the platform to a height of 2m.
- Tilt the tilt detector (see photo) and check that a signal is given (the signal should be audible from the platform).
- Check that after 1-2 seconds, it is no longer possible to raise the platform by activating the manipulator.

	CORRECTIVE MAINTENANCE SHEET	

SHEET C007	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING A COIL	

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

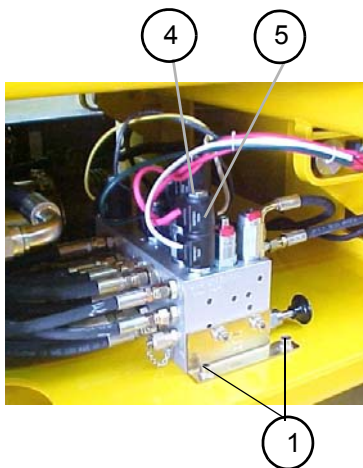
2 - Removing a coil

- Unscrew the two fixing screws (1) from the fixing lug and take out the hydraulic block.
- Disconnect the relevant coil's electric connector (2).
- Unscrew the nut (3) or (4) and remove the coil (5).

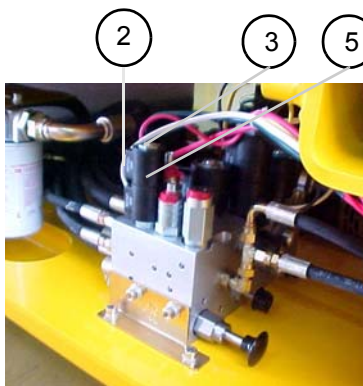
3 - Replacing a coil

- Put a new coil (5) into place and secure with the nut (3) or (4).
- Reconnect the electric connector (2) on the coil.
- Put the hydraulic block back into place and secure with the screws (1) equipped with new flat and toothed washers.
- Put the machine back into the operational configuration.

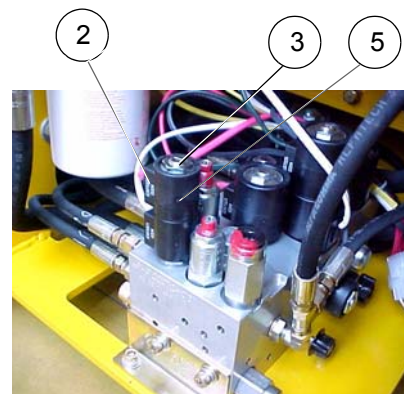
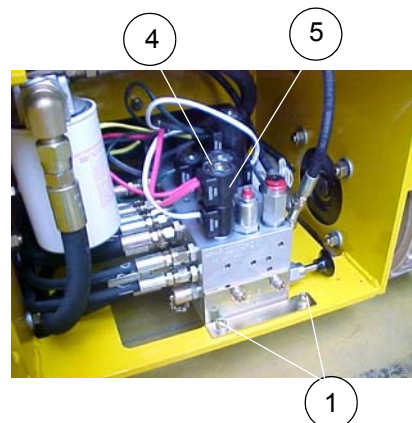
Check that the coil works properly by performing the movement corresponding to the replaced coil.



Compact



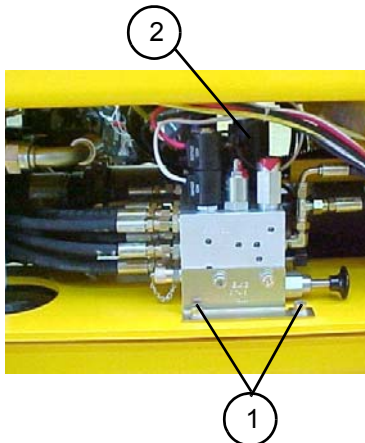
Optimum



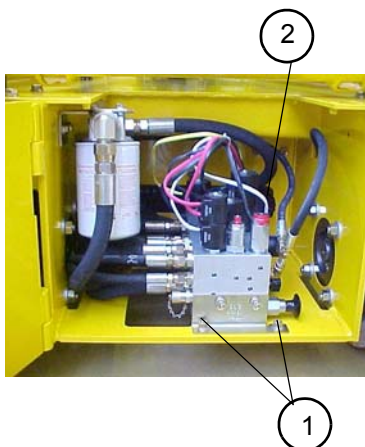
	CORRECTIVE MAINTENANCE SHEET	

SHEET C008	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING THE TRAVEL ELECTROVALVE	

Caution!
*Ensure that oil temperature
 is not too high.*



Compact



Optimum

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing the travel electrovalve

- Unscrew the two screws (1) on the fixing lug and take out the hydraulic block.
- Mark and disconnect the coil's electric connections.
- Remove the coils of the electrovalve (2) and remove it.

3 - Replacing the travel electrovalve

- Put a new electrovalve equipped with its seal into place.
- Reconnect the electric connections on the coils.
- Put back the hydraulic block and secure using the screws (1) equipped with new flat and toothed washers.
- Put the machine back into the operational configuration.
- Make several travel movements to check that it works properly.

	CORRECTIVE MAINTENANCE SHEET	

SHEET C009	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING THE HYDRAULIC FILTER	

Caution!

Ensure that oil temperature is not too high.

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing the hydraulic filter

- Disconnect the two hydraulic filter hoses.
- Fit caps on the hoses.
- Unscrew the fixing screws (1) and remove the hydraulic filter.
- Remove the two hydraulic filter connections (2).

3 - Replacing the hydraulic filter

- Put the two connections (2) on a new hydraulic filter.
- Put the equipped hydraulic filter into place, respecting the oil flow direction; secure with the fixing screws.
- Reconnect the hydraulic hoses.
- Put the machine back into the operational configuration.
- Perform several lifting cycles to purge the hydraulic circuit.



Compact



Optimum

	CORRECTIVE MAINTENANCE SHEET	

SHEET C010	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING A HOSE	

Caution!
Ensure that oil temperature
is not too high.

1 - Preliminary operations

- Put the machine in the maintenance configuration (see corresponding paragraph).
- Cut off the electric power supply (see corresponding paragraph).

2 - Removing a hose

- Disconnect the hose from the equipment it connects.

NB: *Unscrew the hose slowly to allow residual hydraulic pressure to dissipate.*

- Fit caps to the equipment holes to protect them.

3 - Replacing a hose

- Reconnect a new hydraulic hose.
 - Put the machine back into the operational configuration.
 - Make several movements using the replaced hose to purge the hydraulic circuit.
 - Check the oil level in the hydraulic oil tank.
-

C010	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C011	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING A VACUUM BRAKE	

Caution!
Ensure that oil temperature
is not too high.

1 - Preliminary operations

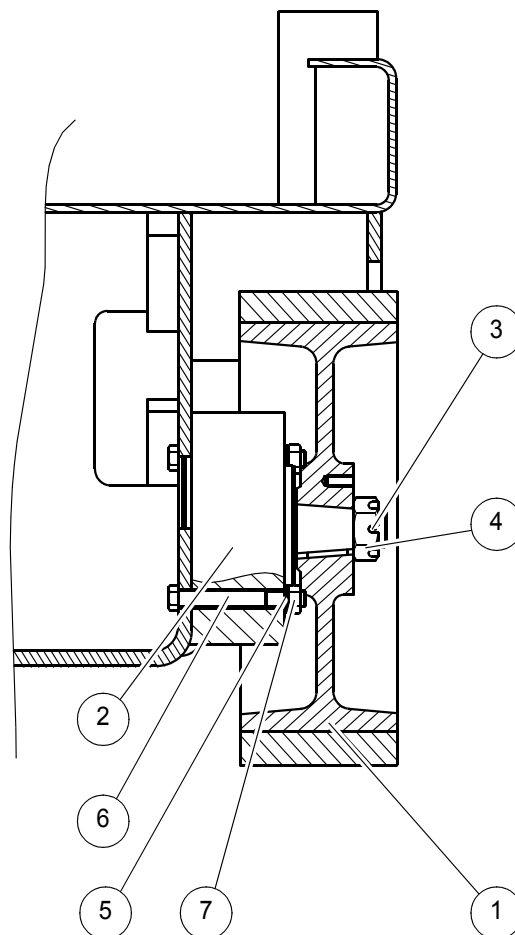
- Put the machine in the low configuration.
- Cut off the electric power supply (see § 6.3, page 26).
- Raise the machine using a jack or hoist.

2 - Removing a vacuum brake (see figure 1)

- Remove the pin (3) and nut (4) fixing the wheel and remove the wheel (1).
- Place a wedge under the vacuum brake.
- Disconnect the vacuum brake's hose.
- Fit a cap to the hose.
- Remove the vacuum brake (2) by removing its fixing bolts (5) (6) (7).

3 - Replacing a vacuum brake

- Put the new vacuum brake (2) into place.
- Secure the vacuum brake using the fixing bolts equipped with new elastic washers (5).
- Reconnect the hydraulic hose.
- Put the wheel (1) into place and secure using the fixing nut and pin.
- Put the machine back into the operational configuration.
- Perform several brake/release operations to purge the hydraulic circuit.
- Check the oil level in the hydraulic oil tank.



Wheel nut tightening torque :
25 N/m

To fix the pin, the slot must
be in front of an hole : at this
time we can screw until
30 N/m.

Fig. 1

	CORRECTIVE MAINTENANCE SHEET	

SHEET C012	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING A PRESSURE LIMITER ON THE HYDRAULIC BLOCK	

Caution!
*Ensure that oil temperature
is not too high.*

1 - Preliminary operations

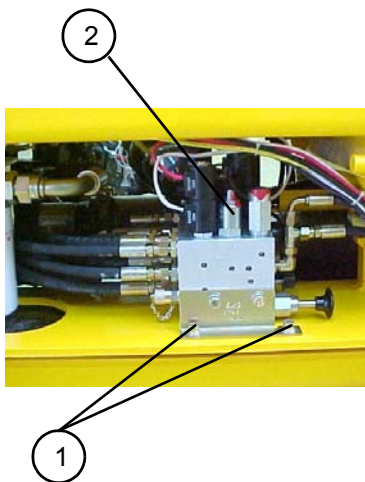
- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing a pressure limiter from the hydraulic block

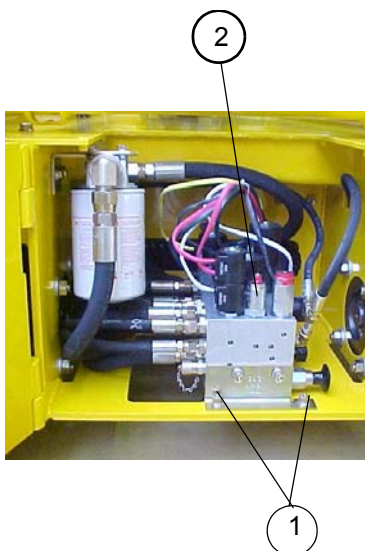
- If necessary, unscrew the two fixing screws (1) from the fixing lug and remove the hydraulic block.
- Unscrew the pressure limiter (2) and take it out of the hydraulic block.

3 - Replacing a pressure limiter in the hydraulic block

- Screw a new pressure limiter equipped with its seal onto the hydraulic block.
- Put the hydraulic block back into place, if applicable, and secure with screws (1) equipped with new flat and toothed washers.
- Put the machine back into the operational configuration.
- Set the limiter to the required pressure.
- Perform several movements using the replaced pressure limiter to check that it works properly.
- Check the oil level in the hydraulic oil tank.



Compact



Optimum

	CORRECTIVE MAINTENANCE SHEET	

SHEET C013	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING THE MANIPULATOR	

Caution!
Do not use the machine during maintenance operations.



1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing the manipulator (2)

- Remove the closing plate (1) by removing the four fixing screws.
- Mark and disconnect the manipulator's electric connections.
- Remove the manipulator by removing its fixing screws.

3 - Replacing the manipulator

- Fix a manipulator, equipped with new seals, to the platform control panel.
- Reconnect the electric connections, according to the marks made when dismantling.
- Put the closing plate back into place and secure with the four fixing screws.
- Put the machine back into the operational configuration.
- Make several up and down movements from the platform to check that the manipulator works properly.

	CORRECTIVE MAINTENANCE SHEET	

SHEET C014	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING A HYDRAULIC TRAVEL MOTOR	

Caution!
Ensure that oil temperature
is not too high.

1 - Preliminary operations

- Put the machine in the low configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).
- Raise the machine using a jack or hoist.

2 - Removing a hydraulic travel motor (see figure 1)

- Remove the pin (2) and nut (1) fixing the wheel and remove the wheel (7).
- Mark and disconnect the two hydraulic motor hoses.
- Fit caps to the hoses.
- Place a wedge under the hydraulic motor.
- Remove the hydraulic motor (4) by removing its four fixing bolts (3) (5) (6).

3 - Replacing a hydraulic travel motor

- Put a new hydraulic motor into place.
- Secure the hydraulic motor using the four fixing bolts, equipped with new elastic washers.
- Reconnect the hydraulic hoses according to the marks made when dismantling.
- Put the wheel back and secure with the fixing nut and pin.
- Put the machine back into the operational configuration.
- Make several travel movements to purge the hydraulic circuit.
- Check the oil level in the hydraulic oil tank.

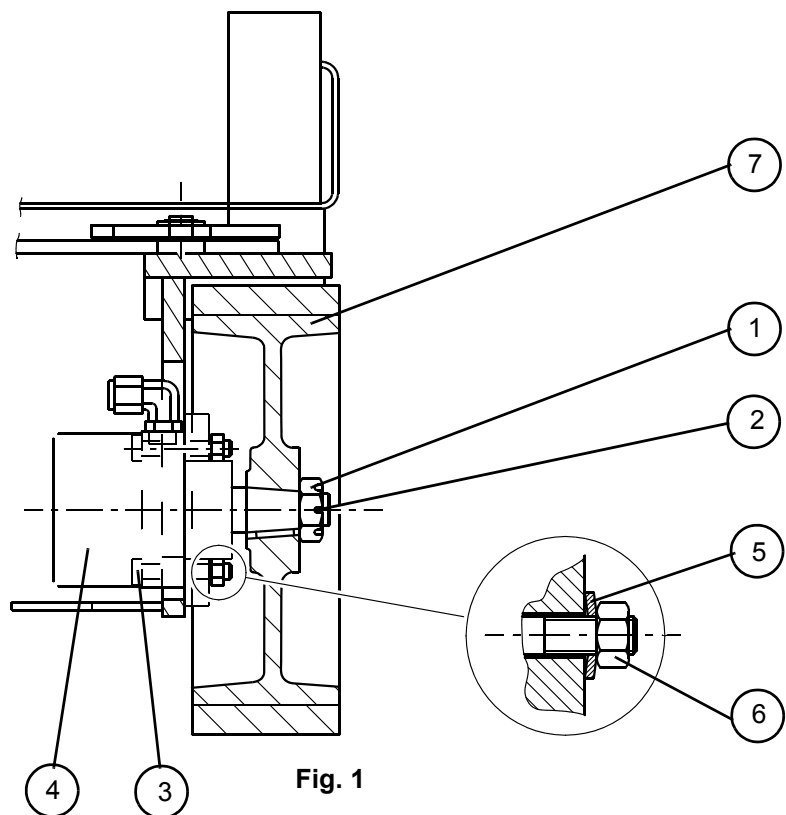


Fig. 1

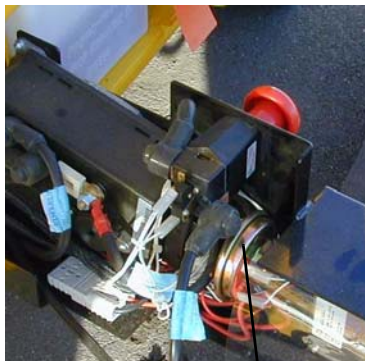
Wheel nut tightening torque : 25 N/m

To fix the pin, the slot must be in front of an hole : at this time we can screw until 30 N/m.

	CORRECTIVE MAINTENANCE SHEET	

SHEET C015	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING THE BUZZER	

Caution!
Do not use the machine
during maintenance
operations.



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Optimum

1 - Preliminary operations

- Cut off the electric power supply (see § 6.3, page 26).

2 - Remove the buzzer

- Mark and disconnect the buzzer's electric connections (1).
- Remove the buzzer by unscrewing the fixing bolt.

3 - Replacing the buzzer

- Put the new buzzer into place and secure with the fixing bolt.
- Reconnect the electric connections according to the marks made when dismantling.

4 - Test

- Put the machine back into the operational configuration.
- Check that the buzzer gives a signal below 1.5 metres (or 4ft92in) during lowering.

	CORRECTIVE MAINTENANCE SHEET	

SHEET C016	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING THE DISTRIBUTION BLOCK	

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

Caution!
Ensure that oil temperature
is not too high.

2 - Removing the distribution block

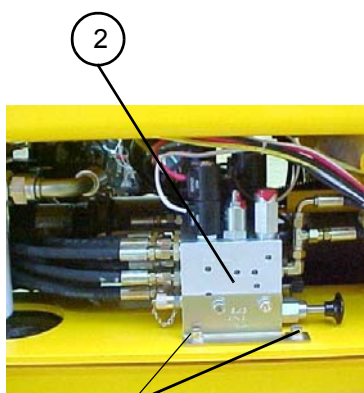
- Remove the fixing lug (1) securing the distribution block to the chassis, and take out the distribution block (2) to access its components.
- Mark and disconnect the distribution block's electric connections.
- Mark and disconnect the distribution block's hydraulic hoses.

NB: *Unscrew the hoses slowly to allow the residual hydraulic pressure to dissipate.*

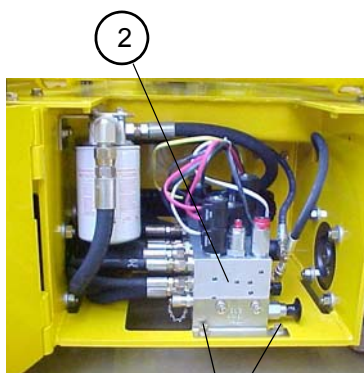
- Fit caps to the hoses.
- Remove the distribution block.

2 - Replacing the distribution block

- Put the new distribution block into place.
- Reconnect the hydraulic hoses according to the marks made when dismantling.
- Reconnect the distribution block's electric connections, according to the marks made when dismantling.
- Secure the distribution block to the chassis using the fixing lug, screws and washers.
- Put the machine back into the operational configuration.
- Perform several lifting, steering and travel cycles to purge the hydraulic circuit.
- Check the oil level in the hydraulic oil tank.



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	CORRECTIVE MAINTENANCE SHEET	

SHEET C017	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING THE REMOTE CONTROL	

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

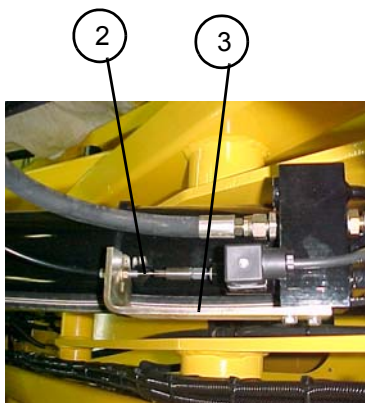
2 - Removing the remote control

- Remove the protective plate (1) of the chassis control station (for **Compact** machines).
- Release the manual control cable (2) of the covered distributing valve on the lifting cylinder.
- Unscrew the plate sheath stop (3) supporting the cable.
- Mark the cable route in the scissor ducts and remove the cable from the ducts.
- Unscrew the blocking nut of the emergency pull (1) and remove the pull and cable assembly.



4

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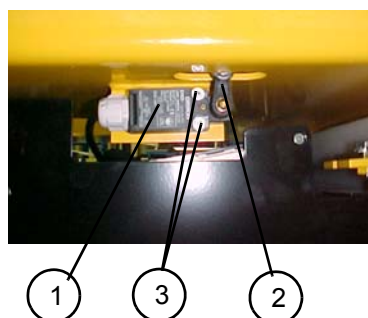
3 - Replacing the remote control

- Put the remote control cable back into place in the scissor ducts, according to the route marked when dismantling.
- Put the emergency pull (1) in place on the chassis and secure with the blocking nut.
- Screw the sheath stop onto the cable support plate (3) at the distributing valve level.
- Secure the cable to the distributing valve manual control.
- Put the chassis control panel protective plate (4) back into place (for **Compact** machines).
- Put the machine back into the operational configuration.
- Raise the platform to a height of 2m (or 6ft56in) and activate the emergency pull to check that it works properly.

	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C018	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING AN END OF STROKE CONTACTOR	

Caution!
Do not use the machine during maintenance operations.



1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing an end of stroke contactor

- Mark the position of the end of stroke contactor (1) and its lever (2).
- Remove the end of stroke contactor.
- Open the end of stroke contactor, mark and disconnect the electric connections.

3 - Replacing an end of stroke contactor

- Open the new end of stroke contactor, reconnect the electric connections and close the end of stroke contactor.
- Move the end of stroke contactor's lever (2) back to the position marked when dismantling.
- Put the end of stroke contactor into place in the position marked when dismantling and secure with bolts (3) without tightening.

4 - Test

- Put the machine into the operational configuration.
- Perform the movement, using the contactor concerned (see table) and check that it works properly.
- Adjust the contactor position if necessary and tighten the fixing bolts.

CONTACTOR	MOVEMENT TO BE MADE	CHECK
Lifting end of stroke (SQ3)	Lifting	Lifting disabled in the high position
Pothole end of stroke (SQ5 and SQ6)	Lifting	• Extension of the potholes when the platform reaches 1.5m. • Microspeed present
	• Disconnect YV6 • Lifting	• Lifting impossible beyond 1.5m • Travel impossible beyond 1.5m
Tilt reset end of stroke (SQ1)	Lifting beyond 1.5m and lowering	Check that the lowering movement is correct with an interruption at 1.5m.
8m end of stroke switch (SQ4) (H12SN only)	Lifting beyond 8m	Travel impossible (microspeed disabled)

	CORRECTIVE MAINTENANCE SHEET	

SHEET C019	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING THE MOTOR PUMP SET	

1 - Preliminary operations

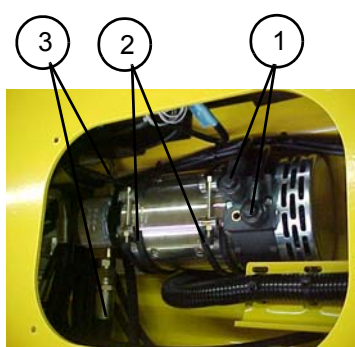
- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

Caution!
Ensure that oil temperature
is not too high.

NB: Lift the platform using a gantry crane or fork-lift truck

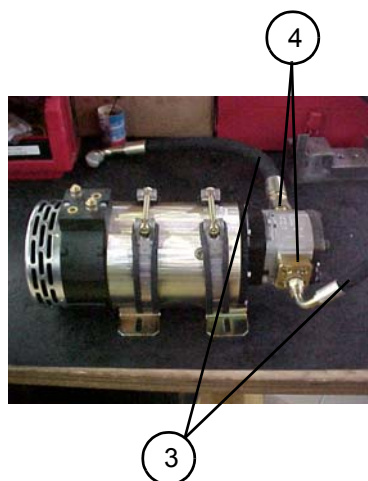
2 - Removing the motor pump set

- Remove the upper inspection flap (for **Compact** machines).
- Mark and disconnect the motor's electric connections (1).
- Mark and disconnect the hydraulic pump's hoses (3).
- Fit caps to the hoses.
- Remove the fixing collars (2) from the motor pump set and remove the motor pump set.
- Remove the hydraulic pump's suction and backflow flanges (4).



3 - Replacing the motor pump set

- Put the suction and backflow flanges equipped with new seals on a motor pump set.
- Put the motor pump set into place and secure with the collars.
- Reconnect the hydraulic hoses to the pump according to the marks made when dismantling.
- Reconnect the electric connections to the motor according to the marks made when dismantling.
- Close the inspection flap (for **Compact** machines).
- Put the machine back into the operational configuration.
- Perform several lifting cycles to purge the hydraulic circuit.
- Check the oil level in the hydraulic oil tank.



	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C020	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING A HYDRAULIC BLOCK VALVE	

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

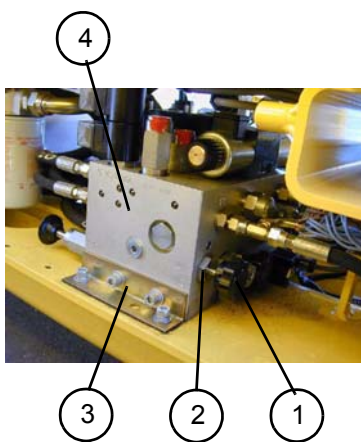
Caution!
Ensure that oil temperature
is not too high.

2 - Removing a valve from the hydraulic block

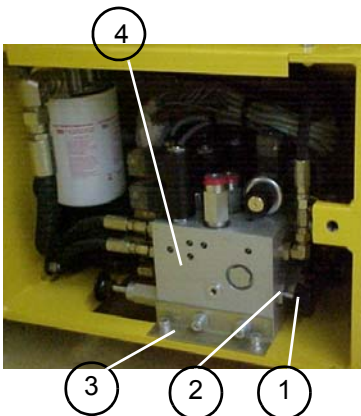
- Unscrew the fixing screws (3) and take out the hydraulic block (4) if necessary to make access easier.
- Open the valve concerned.
- Unscrew the base (2) of the valve (1) and remove from the hydraulic block.
- Fit a cap to the hydraulic block hole to protect it.

3 - Replacing a valve in the hydraulic block

- Screw a new valve onto the hydraulic block.
- Put the valve back into its initial state.
- Fix the hydraulic block on with the fixing screws (3).
- Put the machine back into the operational configuration.
- Make several travel movements to purge the hydraulic circuit.



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	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C021	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING A WHEEL	

1 - Preliminary operations

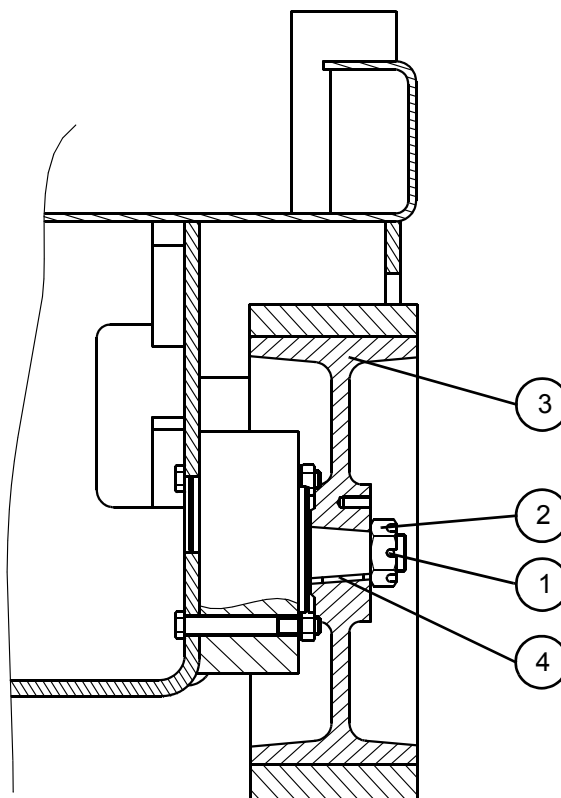
- Put the machine in the low configuration.
- Cut off the electric power supply (see § 6.3, page 26).
- Raise the machine using a jack or hoist.

2 - Removing a wheel

- Remove the pin (1) and fixing nut (2) from the wheel and remove the wheel (3).

3 - Replacing a wheel

- Replace the key (4) if necessary.
- Put a new wheel into place and secure with the fixing nut and pin.
- Put the machine back into the operational configuration.



Wheel nut tightening torque : 25 N/m

To fix the pin, the slot must be in front of an hole : at this time we can screw until 30 N/m.

	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C022	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING THE BRAKE RELEASE HAND PUMP	

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).
- Check that the brake release valve NV1 is open.

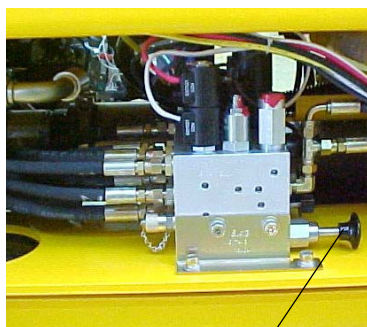
Caution!
Ensure that oil temperature
is not too high.

2 - Removing the brake release hand pump

- Unscrew the brake release hand pump (1) and take it out of the hydraulic block.
- Put a cap on the hydraulic block hole to protect it.

3 - Replacing the manual brake hand pump

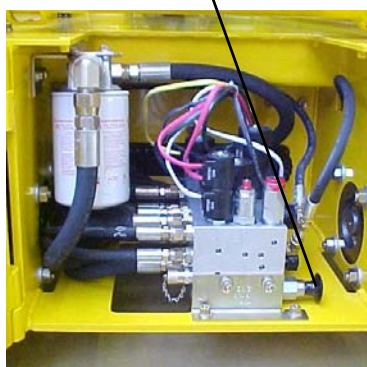
- Screw a new brake release hand pump into place.
- Put the machine back in the operational configuration.
- Apply and release the brakes manually several times to purge the hydraulic circuit.



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	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C023	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING THE STEERING CYLINDER	

Caution!
Ensure that oil temperature
is not too high.

1 - Preliminary operations

- Put the machine in the low configuration.
- Cut off the electric power supply (see § 6.3, page 26).
- Raise the machine with a jack or hoist.

2 - Removing the steering cylinder

- Mark and disconnect the two steering cylinder hoses (1).



NB: Unscrew the hose slowly to allow residual hydraulic pressure to dissipate.

- Fit caps to the hoses.
- Put the cylinder into slings.
- Remove the screws (3) and blocking yokes (4) then remove the steering cylinder's two axles (2).
- Remove the steering cylinder.

1

3 - Replacing the steering cylinder

- Put a new steering cylinder into place.
- Replace the axles and blocking yokes and secure with screws equipped with new toothed washers.
- Reconnect the hydraulic hoses according to the marks made when dismantling.
- Put the machine back into the operational configuration.
- Make several steering movements to purge the hydraulic circuit.
- Check the oil level in the hydraulic oil tank.

3 2 4



	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C024	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING A POTHOLE CYLINDER	

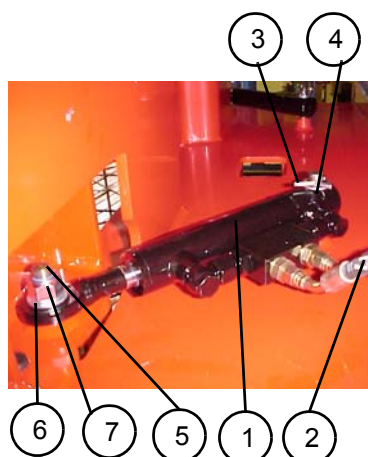
1 - Preliminary operations

- Put the machine into the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

Caution!
Ensure that oil temperature
is not too high.

2 - Removing a pothole cylinder

- Mark and disconnect the two hoses (2) of the pothole cylinder (1). Fit caps to the hoses.
- Remove the special screw (5), washer (6) and nut (7) from the lower axle.
- Remove the pin (3) and washer (4) from the cylinder's upper joint and remove the pothole cylinder.



3 - Replacing a pothole cylinder

- Put a new pothole cylinder into place on the upper axle.
- Put the washer into place and secure a new pin.
- Fix the pothole cylinder rod yoke with the special screw, washer and a new nut.
- Reconnect the hydraulic hoses according to the marks made when dismantling.
- Put the machine back into the operational configuration.
- Perform several up/down movements from the platform above 1.5 meters (or 4ft9in) and travel movements with the platform lowered to purge the hydraulic circuit.
- Check that the pothole protective system extends and retracts correctly.

NOTA : *If counterweights are fitted with the potholes, check that their position remains correct before replacing the cylinder.*

	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C025	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING A PLATFORM EXTENSION	

1 - Preliminary operations

- Put the machine in the low position.
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing the platform extension

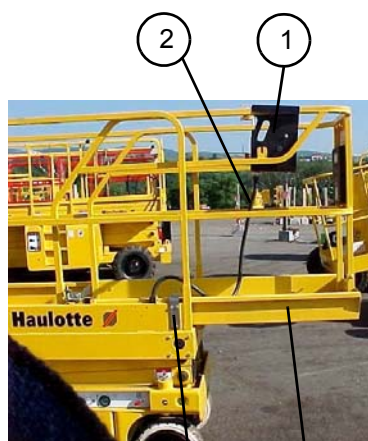
- Remove the electric plug and its support, if any, from the platform.
- Remove the control panel (1) and the platform wiring harness (2).
- Put the platform extension (3) into slings.
- Remove the locking pedal (4) and support (5) assembly.
- Remove the two roller and roller axle assemblies at the back of the extension by unscrewing the fixing screws (6).
- Remove the two safety brackets (7).
- Remove the platform extension.

3 - Replacing the platform extension

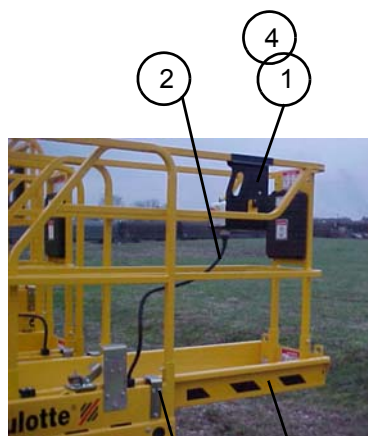
- Put the platform extension into place.
- Secure the two safety brackets.
- Put the locking pedal and support assembly, the two rollers and their axles back into place and secure with screws equipped with new toothed washers.
- Install the electric plug support.
- Put the platform control panel back into place and reconnect the platform wiring harness.
- Grease the friction parts of the slides.

NB: *Only use the grease recommended by the manufacturer.*

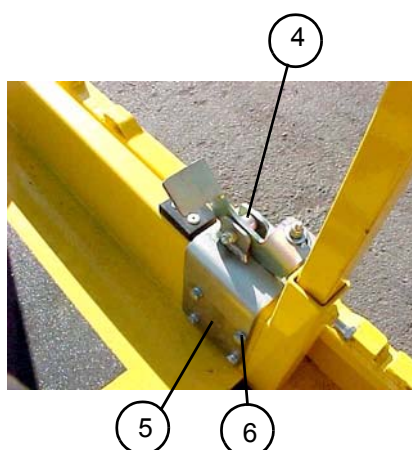
- Put the machine back into the operational configuration.
- Check that the platform extension can be extended and retracted easily.



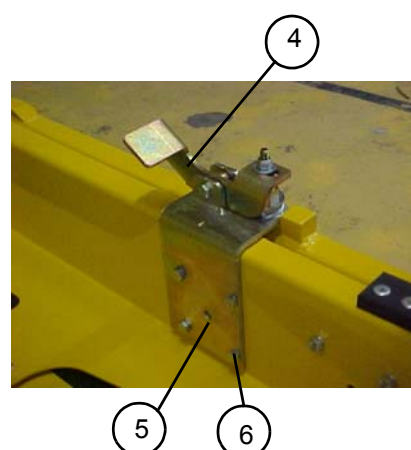
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	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C026	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING THE PLATFORM	

1 - Preliminary operations

- Put the machine in the low position.
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing the platform

- Disconnect the wiring harness (1) from the platform control panel.
- Remove the control panel and remove the wiring harnesses from the platform.
- Remove the electric plug and its support, if any, from the platform.
- Put the platform into slings.
- Remove the axle stop bolts from the four platform axles (two fixed axles (2) and two moving axles (3)) and remove the four axles.
- Remove the platform.
- Remove the four pads and check their condition, remove the adjustment wedges if necessary.



1

3 - Replacing the platform

- Put the four pads into place (fixed and moving) on the platform.
- Put the platform on the scissors.
- Put the four fixed and moving platform axles into place and secure with the axle stop bolts.

NB:

Fit the bolts so that the screw is on the outside of the platform and the nut on the inside (see diagram).



2

- Remount the electric plug, if applicable, on the platform.
- Put back the platform control panel.
- Grease the slides using a spatula

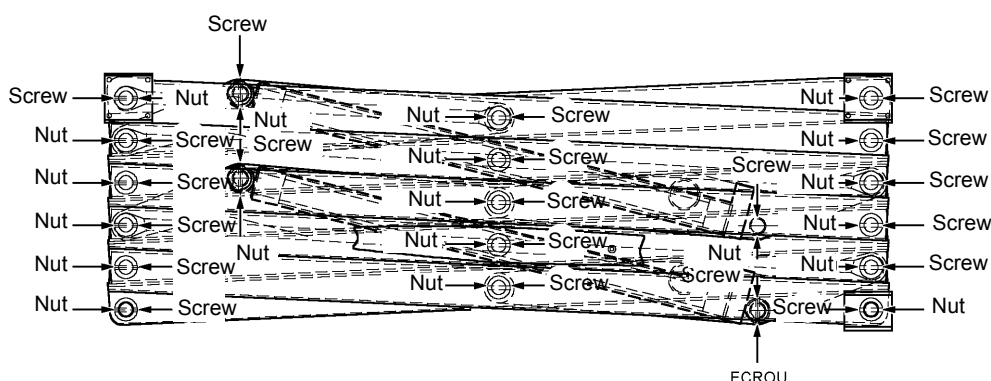
NB:

Only use the grease recommended by the manufacturer.

- Put the machine back into the operational configuration.
- Perform several lifting cycles to check that the machine works properly.



3

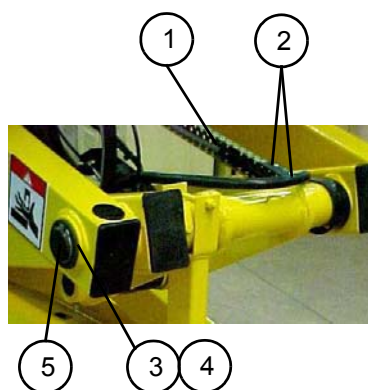


	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C027	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING THE SCISSORS	

1 - Preliminary operations

- Put the machine in the low position.
- Cut off the electric power supply (see § 6.3, page 26).

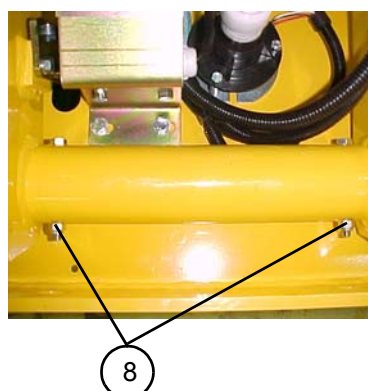


2 - Remove the scissors

- Remove the platform (see SHEET C025).
- Remove the lifting cylinder(s) (see SHEET C001).
- Mark and remove the hydraulic hoses and electric wiring harness routed along the scissors.
- Fit caps on the hoses and hydraulic equipment.
- Put the scissors into slings.
- Remove the two axle stop bolts (8) on the two fixed chassis axles.
- Remove the two fixed chassis axles using the threaded holes.
- Remove the scissors and pads.

3 - Dismantling the scissors

- Carefully mark the equipment's assembly.
- Remove the cable passage ducts (1):
 - counterbore the eight rivets (2) at both ends of the duct and remove the straps,
 - remove the duct,
 - remove the upper duct stop bracket.
- Put each element into slings and remove, one after the other, removing the elastic rings (3) and washers (4) from the articulation axles (5).



NB: Remove the scissor elements starting from the top.

4 - Reassembling the scissors

- Reassemble according to the dismantling procedure in reverse order, respecting the marks made when dismantling.

5 - Replacing the scissors

- Check the condition of the pads and replace if necessary.
- Put the scissors into slings and into place on the chassis.
- Check that the axial clearance between the chassis and the lower arm (6) does not exceed 1mm; otherwise, adjust the clearance using the adjustment wedges (7) provided (see figure 2).
- Put the two fixed chassis axles into place and secure using the two axle stop bolts.

NB: Fit the bolts so that the screw is on the top of the axle and the nut is underneath (see figure 1).

- Replace the hydraulic hoses and electric wiring harness routed along the scissors, according to the marks made when dismantling.
- Replace the lifting cylinder(s) (see SHEET C001).
- Replace the platform (see SHEET C025).
- Put the machine back into the operational configuration.
- Grease the slides using lead-free grease.

Sheet C027	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2
	REPLACING THE SCISSORS	

NB: Only use the grease recommended by the manufacturer.

- Perform several lifting cycles to check that the machine works properly.

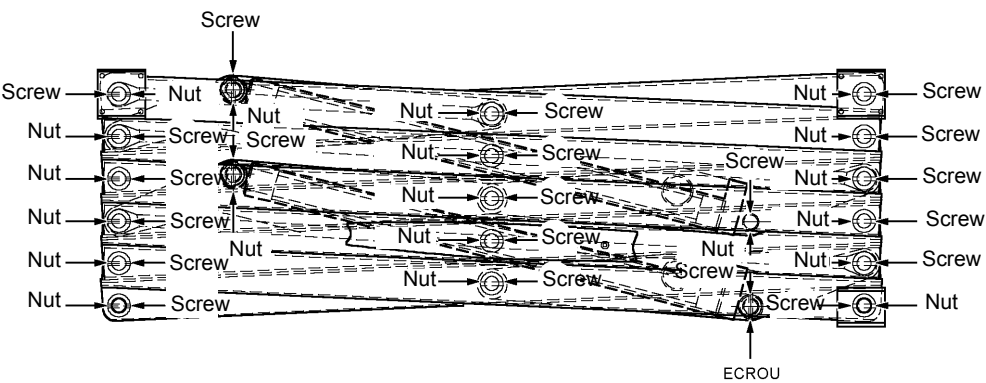


Fig. 1

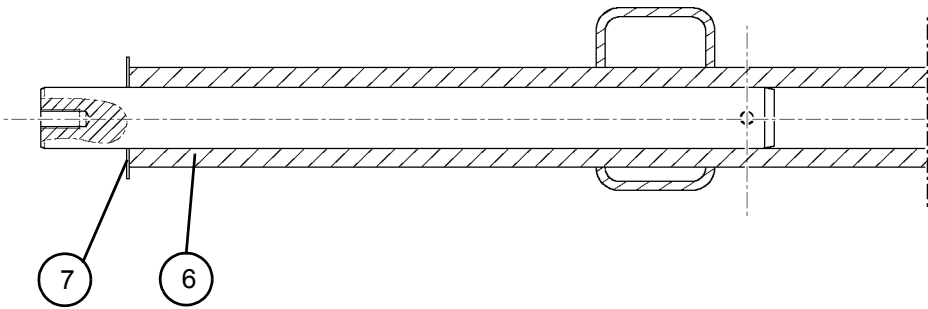


Fig. 2

SHEET C028	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING A SCISSOR RING OR AXLE	

1 - Preliminary operations

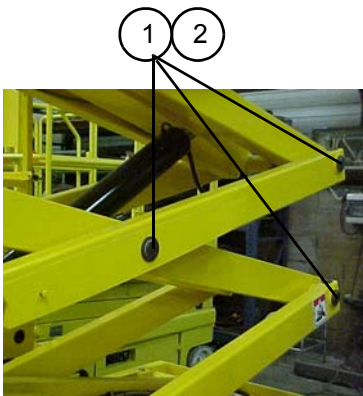
- Put the machine in the low position.
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing a scissor axle (1) or ring (2)

- Remove the platform (see SHEET C026).
- Remove the elastic ring and washer from the scissor axle in question.
- Remove the axle stop bolt.
- Take out the scissor axle.
- Take out the two scissor rings.

3 - Replacing a scissor axle or ring

- Put new scissor rings into place.
- Put the scissor axle into place and secure using the axle stop bolt.



NB: Fit the axle stop bolts so that the screw is above the axle and the nut underneath when the platform is in the high position (see figure below)

- Put the washer and elastic ring back into place.
- Put the platform back (see SHEET C026).
- Put the machine back into the operational configuration.
- Make several lifting movements and check that the scissors work properly.

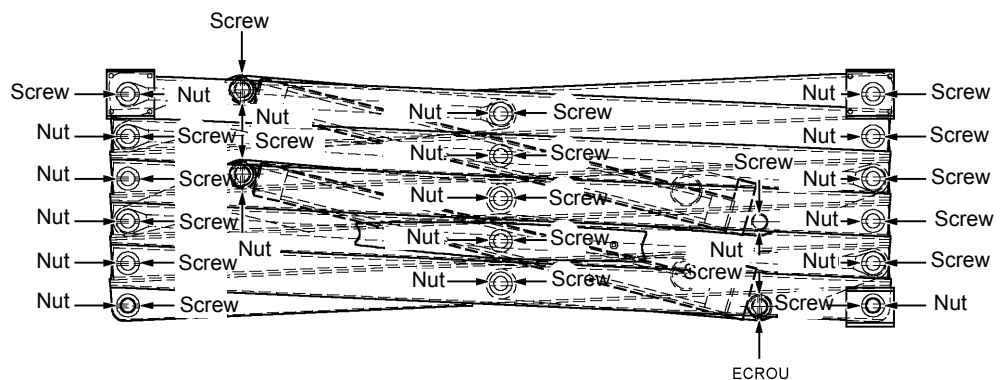
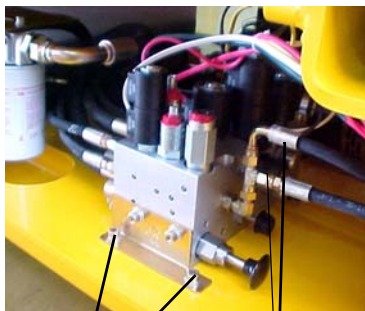


Fig. 1

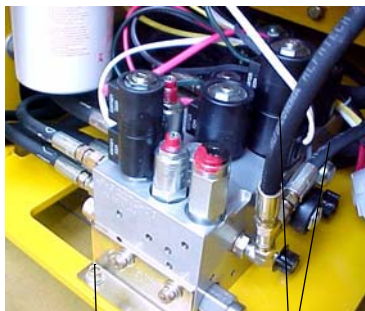
	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C029	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING THE BALANCING VALVES	

Caution!
Ensure that oil temperature
is not too high.



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Caution!
The balancing valves are
safety elements.
They are calibrated in the
plant and must not be re-
adjusted.

1 - Preliminary operations

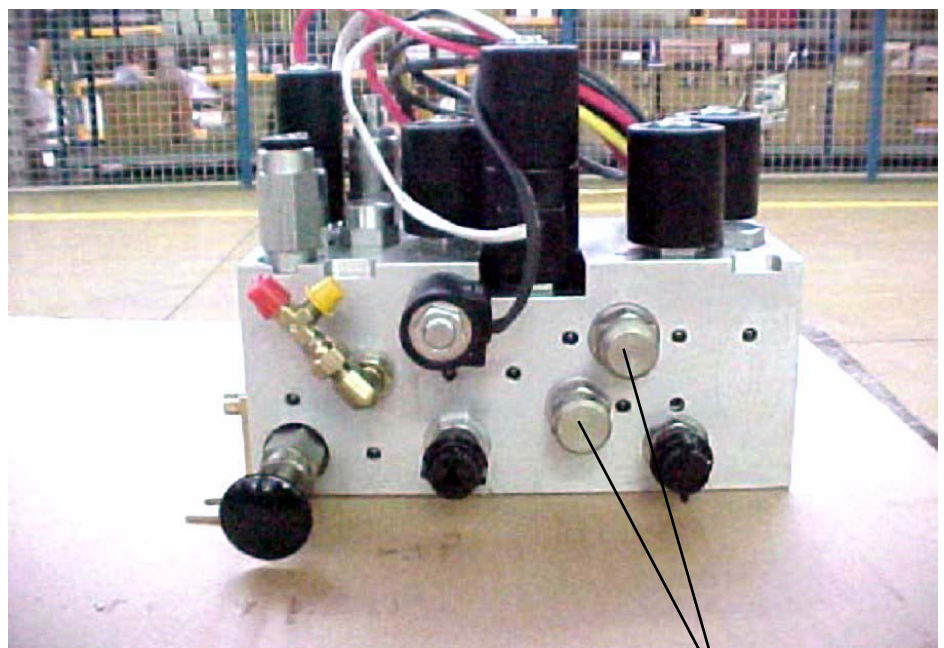
- Put the machine in the low position.
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing the balancing valves

- Disconnect the hydraulic brake hoses (2) and close the holes on the pipework and hydraulic block.
- Unscrew the two screws (1) of the fixing lug and take out the hydraulic block.
- Remove the balancing valves (3) by unscrewing them.

3 - Replacing the balancing valves

- Screw the new balancing valves (whose characteristics correspond to the machine in question) into the hydraulic block.
- Put the hydraulic block back into place and secure using the screws (1) equipped with new flat and toothed washers.
- Reconnect the hydraulic brake hose onto the block.
- Make several travel movements to purge the circuit.
- Position the machine on a 40% slope and check that the machine does not go into runaway during a travel movement.



3

	CORRECTIVE MAINTENANCE SHEET	

SHEET C030	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING A CARTRIDGE ELECTROVALVE	

 **Caution!**
Ensure that oil temperature is not too high.

1 - Preliminary operations

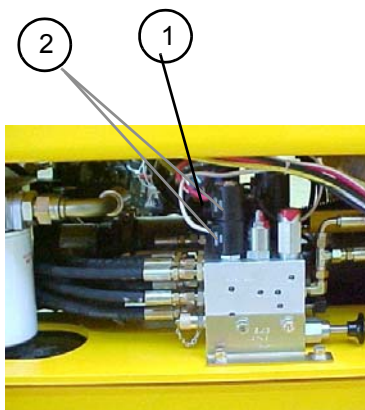
- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).

2 - Removing a cartridge electrovalve

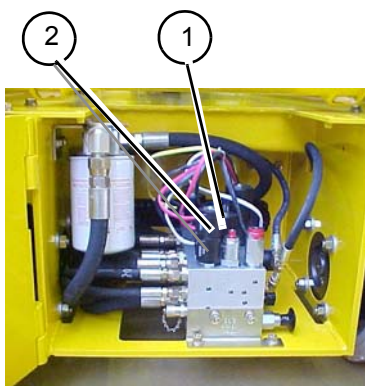
- Remove the coil(s) (2) of the electrovalve (see SHEET C007).
- Unscrew the electrovalve (1) with the Allen key and remove from the hydraulic block.

3 - Replacing a cartridge electrovalve

- Screw a new electrovalve, equipped with its seal, into the hydraulic block.
- Put the coil(s) back into place on the electrovalve and put the hydraulic block back into place (see SHEET C007).
- Put the machine back into the operational configuration.
- Perform several movements using the replaced electrovalve to check that it works properly.



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	CORRECTIVE MAINTENANCE SHEET	

SHEET C031	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING THE CHASSIS EMERGENCY STOP BUTTON	

 **Caution!**
Do not use the machine
during maintenance
operations.

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Disconnect the + and - terminals of the batteries to isolate the electric circuit.

2 - Remove the emergency stop button

- Mark and disconnect the emergency stop button's electric connections (1).
- Remove the emergency stop button (2).

3 - Replacing the emergency stop button

- Put a new emergency stop button into place.
- Reconnect the electric connections according to the marks made when dismantling.

4 - Test

- Put the machine back into the operational configuration.
- Check that the emergency stop button works properly.



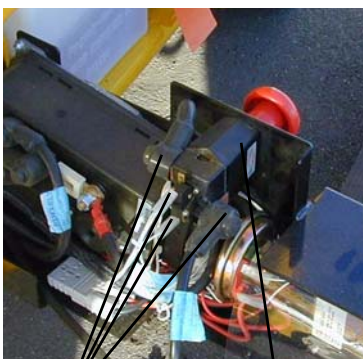
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	CORRECTIVE MAINTENANCE SHEET	

SHEET C032	CORRECTIVE MAINTENANCE SHEET	Sheet 1/2
	REPLACING THE HYDRAULIC PUMP	

1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 25).
- Cut off the electric power supply (see § 6.3, page 26).



Caution!

**Ensure that oil temperature
is not too high.**

2 - Removing the hydraulic pump

- Remove the motorpump set (see SHEET C019).
- Remove the screws securing the pump to the motor and remove the pump.

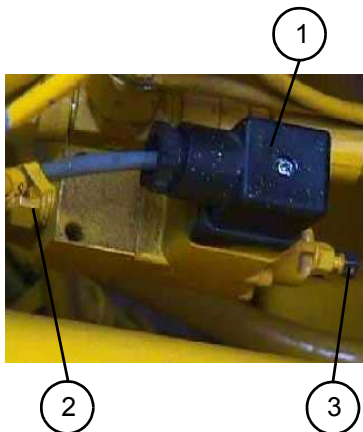
3 - Replacing the hydraulic pump

- Put a new pump equipped with seal onto the electric motor and secure with the fixing screws.
- Remount the motor pump set (see SHEET C019).
- Put the machine back into the operational configuration.
- Perform several lifting cycles to purge the hydraulic circuit.
- Check the oil level in the hydraulic oil tank.

	CORRECTIVE MAINTENANCE SHEET	Sheet 2/2

SHEET C033	CORRECTIVE MAINTENANCE SHEET	Sheet 1/1
	REPLACING AND ADJUSTING A PRESSURE SWITCH	

Caution!
Ensure that oil temperature
is not too high.



1 - Preliminary operations

- Put the machine in the maintenance configuration (see § 6.2, page 29).
- Cut off the electric power supply (see § 6.3, page 30).
- Check low pressure with the emergency control.

2 - Removing the pressure switch

- Disconnect the lifting electric connector (1) from the lifting cylinder's pressure switch.
- Disconnect the pressure switch's hydraulic hose (2).
- Fit a cap to the hose.
- Unscrew and remove the pressure switch fixing screws.

3 - Replacing the pressure switch

- Screw a new pressure switch, equipped with its seal, into place.
- Reconnect the pressure switch's hydraulic hose.
- Reconnect the pressure switch's electric connector.
- Put the machine back into the operational configuration.

4 - Adjusting the pressure switch

- Place a load corresponding to «movement disabling load» in the platform (see table below), raise the platform until the small rod of the lifting cylinder is disengaged and adjust the pressure switch screw (3) located on the lifting cylinder so that the movements are disabled for this given load.
- Check that the machine works properly in all positions with a load slightly less than nominal load on the platform.

Machine	Nominal load	Load setting for disabling movements
H8SN	outdoor use: 120kg indoor use: 350kg	outdoor use: 120kg indoor use: 350kg
H8SW	outdoor use: 120kg indoor use: 450kg	outdoor use: 120kg indoor use: 450kg
H10S	outdoor use: 120kg indoor use: 450kg	outdoor use: 120kg indoor use: 450kg
H12SN	outdoor use: 120kg indoor use: 300kg	outdoor use: 120kg indoor use: 300kg
Optimum 6	outdoor use: 115kg indoor use: 270kg	outdoor use: 115kg indoor use: 270kg
Optimum 8	indoor use: 230kg	indoor use: 230kg

(tolerance: + or - 10%)

	CORRECTIVE MAINTENANCE SHEET	